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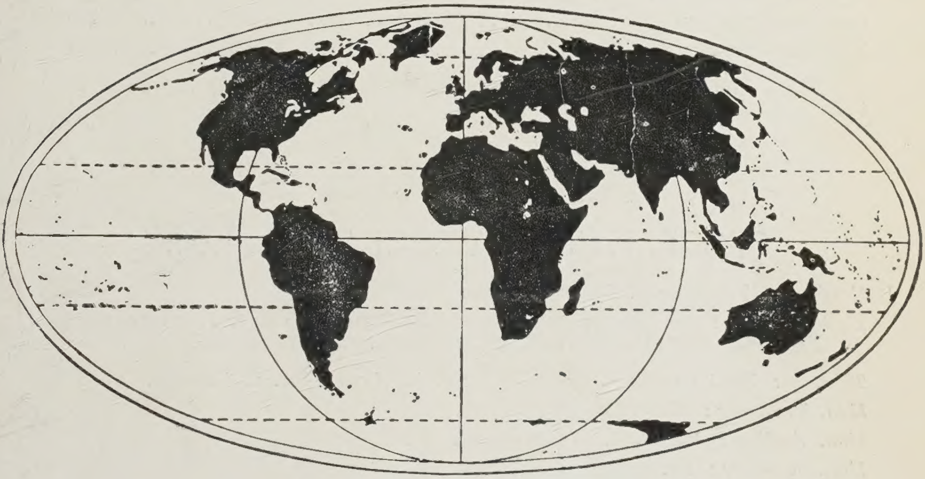

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A NOTE ON IRRIGATION IN CEYLON

E. K. Cook*

CEYLON is not generally regarded as a land in which two-thirds of the area must be irrigated if agriculture is to be successful. Most visitors to the island gain their ideas on its climate and agriculture from the " Wet Zone," the densely-peopled area in the south-west and centre of the island which is, roughly speaking, enclosed by the annual isohyet of 75 in.[1] (see Fig. 1). Although this figure represents a mean annual rainfall about three times that of the London Basin, in Ceylon such an amount is only sufficient to carry on agriculture provided it is well-distributed through the year and not wasted by too rapid run-off after the intense tropical showers. In the Wet Zone, success in agriculture is mainly dependent on adequate safeguards against floods, storage of waters in order that crops may be obtained throughout the year, prevention of soil erosion and the selection of suitable crops. So far as paddy is concerned, wherever there is alluvial soil below the level of about 3,000 ft., two crops could easily be obtained annually. In Ceylon, the crop sown about September and reaped in February or March is known as *maha*, and the crop sown in April and reaped in August and September is known as *yala*. On investigation, however, one finds that in a large number of village paddy-lands either the *yala* crop is unobtainable or it can be obtained only from the lower portions of the land. It is easy to be misled by the statement that both *maha* and *yala* crops are obtained because there are very few paddy lands in which the whole area is cultivated with both crops.

In the flood-plains of the south-western lowlands there are, moreover, areas marked as paddy-lands on the 1-in. survey maps[2] in which

---

* The major part of this essay was dictated by Miss E. K. Cook during her last illness in 1946. It has been edited and completed by Mr. B. H. Farmer and Mr. E. F. Mills, who are also responsible for the footnotes. Both Miss Cook and her book *A Geography of Ceylon* are well known to members of the Geographical Association, and an obituary appeared in *Geography*, vol. xxxi, 1946, p. 159. Miss Cook spent many years in a series of surveys, covering over 500 villages in all parts of Ceylon. Little known by Europeans in the island, she so gained the confidence of the Ceylonese that her name was a password to hospitality even in some of the remotest jungle settlements. Her village surveys so far remain in manuscript, but her intimate knowledge of rural conditions will be very apparent to readers of this essay. Optimistic to the last, when she was flown, seriously ill, back to England, she chose to bring her manuscript material with her and to leave her baggage behind. It may interest readers to know that it was largely due to Miss Cook's forceful initiative that the geography syllabuses in Ceylon were changed from " Britain in detail and the rest of the world in outline " (with Ceylon nowhere) to " Ceylon in detail. . . ."

[1] The 20-in. isohyet for the five south-west monsoon months is more often taken as a limit to the Wet Zone. Recently Cooray has suggested a line based on effective rainfall. (See P. G. Cooray, " Effective Rainfall and Moisture Zones in Ceylon," *Bull. Ceylon Geogr. Soc.*, vol. III, 1948, pp. 39–44 ; and also B. H. Farmer, " Agriculture in Ceylon," *Geogr. Rev.*, vol. lx, 1950, p. 46, Fig. 4.

[2] The excellent 1-in. maps published by the Ceylon Survey Department carry land-use information.

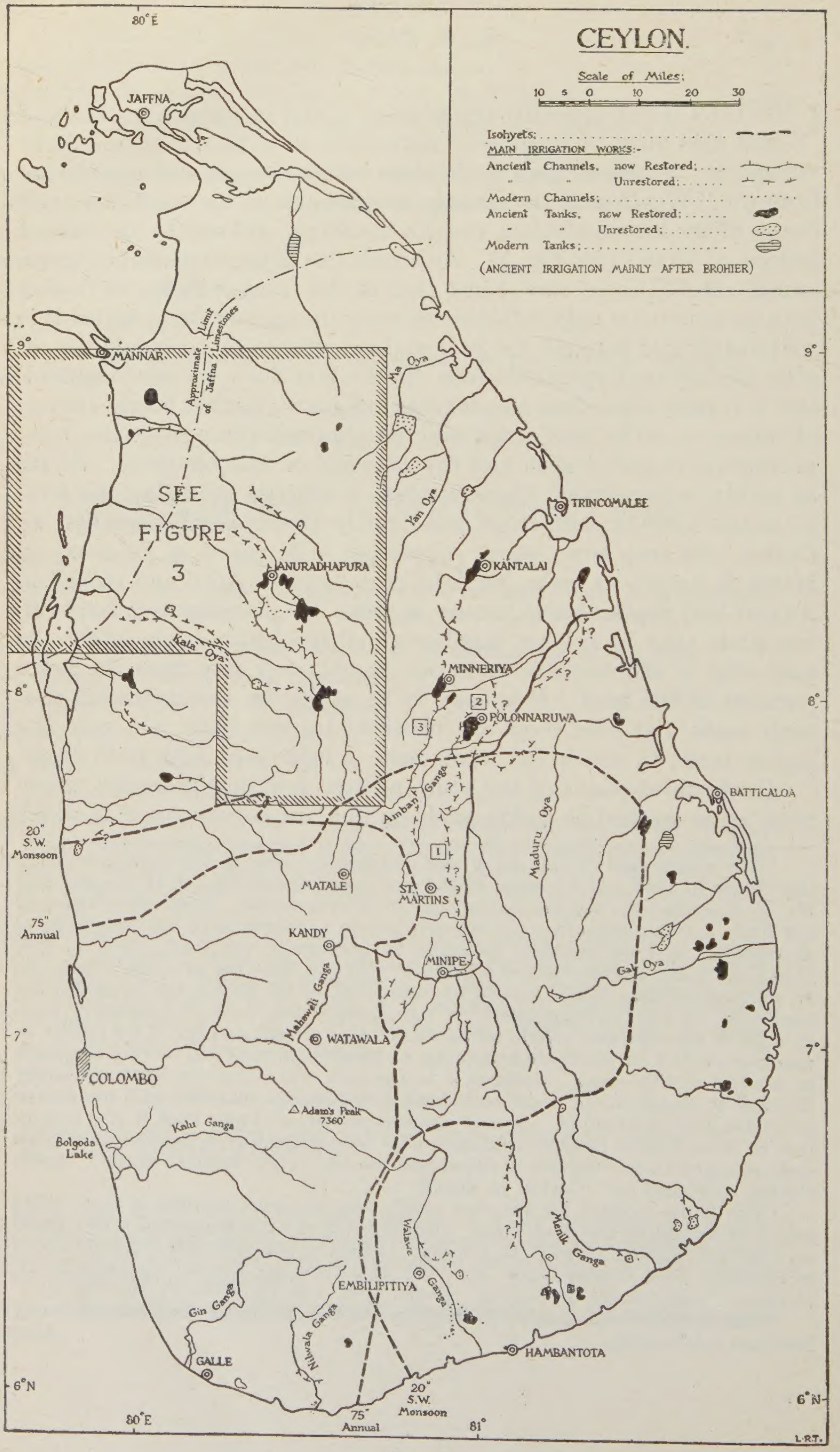
CEYLON.
Scale of Miles:
10 5 0 10 20 30
Isohyets:
MAIN IRRIGATION WORKS:-
Ancient Channels, now Restored;
" " Unrestored;
Modern Channels;
Ancient Tanks, now Restored;
" " Unrestored;
Modern Tanks;
(ANCIENT IRRIGATION MAINLY AFTER BROHIER)
80° E
9°
8°
7°
6° N
81°
JAFFNA
MANNAR
Approximate Limit of Jaffna Limestones
SEE FIGURE 3
Ma Oya
Yan Oya
TRINCOMALEE
KANTALAI
ANURADHAPURA
Kala Oya
MINNERIYA
POLONNARUWA
1
2
3
Amban Ganga
Maduru Oya
BATTICALOA
20" S.W. Monsoon
75" Annual
MATALE
ST. MARTINS
KANDY
MINIPE
Gal Oya
Mahaweli Ganga
WATAWALA
COLOMBO
Adam's Peak 7360'
Kalu Ganga
Bolgoda Lake
Walawe Ganga
Menik Ganga
EMBILIPITIYA
Gin Ganga
Nilwala Ganga
GALLE
HAMBANTOTA
20" S.W. Monsoon
75" Annual
L.R.T.

Fig. 1.

floods are so frequent that in some years not even one crop can be obtained—e.g., near the distributary of the Kalu Ganga which forms the Bolgoda Lake.[3] In recent years a good deal of thought has been expended on schemes which are designed to protect the paddy-lands from floods so that at least one certain crop can be obtained. By 1946, for instance, 68,000 acres in the Kalu Ganga—Bolgoda Lake area were so protected, the Gin Ganga flood plain had works in progress, and schemes were being considered for the Nilwala Ganga. The last-mentioned river presents a very difficult problem as it carries a great volume of water when in flood and has in its lower reaches a large area of alluvial land in which the villages are virtually islands with the houses perched on rock or laterite above flood level. Nearly every year after the heavy rains of the Adam's Peak area in June, July and August, the village sites do become islands in a vast stretch of water, and the people must go about by boat or remain at home until the floods subside. The houses too near the water level are uninhabitable for several months. Even in the drier half of the year, there may be phenomenal rains in the upper reaches which sweep away the young paddy plants just as they become well established. In connection with these flood protection schemes, it may be necessary to construct large inland storage reservoirs to conserve the water. It is proposed to make such a reservoir near Embilipitiya on the Walawe Ganga, a river which has a very large catchment area and regularly discharges enormous quantities of unused water into the sea.

The Dry Zone

In Ceylon every large reservoir is called in Sinhalese " wewa," in Tamil " kulam " and in English a " tank." It is, therefore, necessary to distinguish between the reservoirs designed for flood protection and those of the dry areas which preserve water for the dry season and without which agriculture would be impossible. That portion of Ceylon which has less than 75 in. of rain is generally known as the " Dry Zone "[4]. A large proportion of it has almost all of its rainfall concentrated into about three months, November, December and January (Fig. 2). February is the driest month over the whole island. Most of the inland areas of the Dry Zone have a slight increase of rain after the March equinox which is sufficient to give a start to certain crops which can be grown without irrigation, especially gingelly (*Sesamum indicum*). It is grown on *chenas*—i.e., temporary jungle clearings.[5] During the dry season the spasmodic showers which fall are almost useless. The soil[6] is so hard and baked that the run-off is extremely rapid ; the showers do more harm than good. As they often yield several inches of rain, the run-off may be sufficient to uproot trees. The highest recorded falls in 24 hours, exceeding 30 in.,

---

[3] River, tank and other names are shown in Fig. 1.

[4] But *vide supra*, footnote 1.

[5] See B. H. Farmer, *op. cit.*, p. 60.

[6] See A. W. R. Joachim, " Progress in the Study of the Soils of Ceylon," *Jour. Ceylon. Assoc. of Sci.*, Pt. 3, 1945, pp. 21–30.

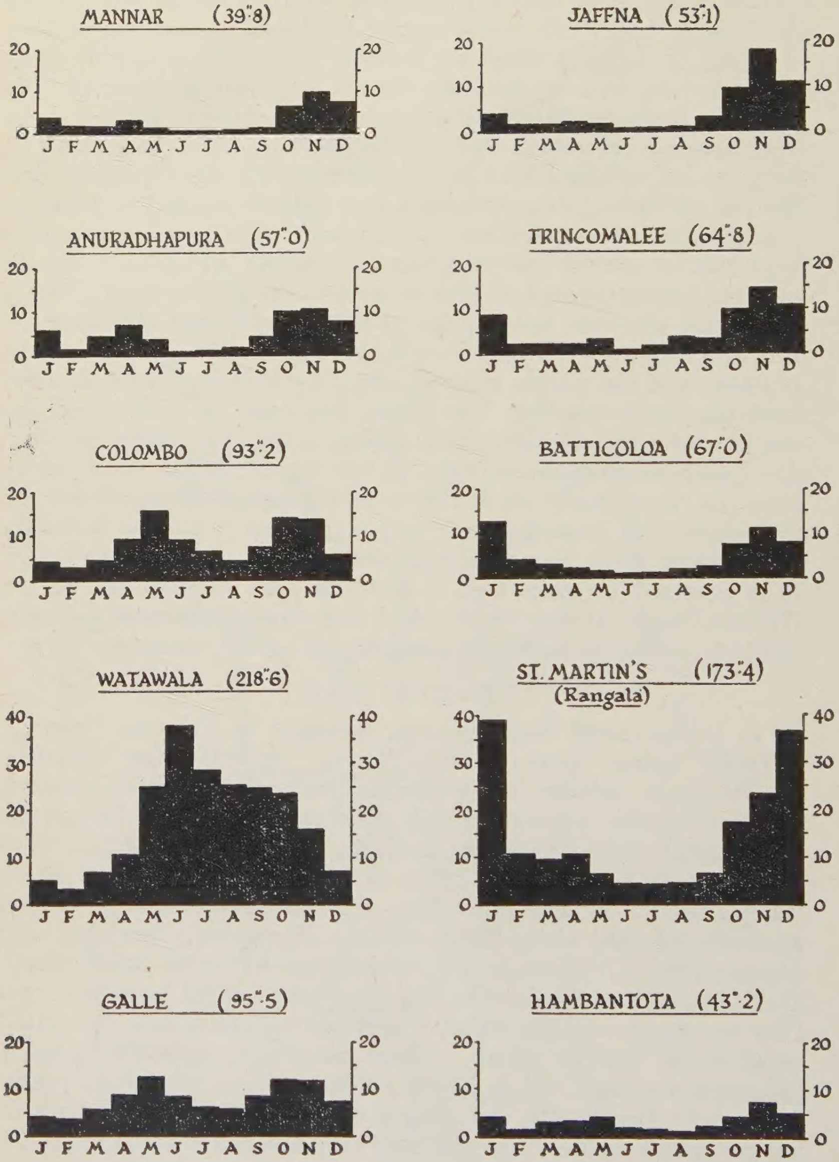

Fig. 2: CEYLON RAINFALL (inches)

have been in the Dry Zone. A large proportion of the soil has a heavy clay element and absorbs water very slowly. The Jaffna limestone region[7] on the other hand, has good friable soil which can be tilled and seeds planted before the rains begin ; but in most places tillage is impossible until the ground has been well soaked. It works out, therefore, that a crop can generally be raised on the rainfall of November to January. Where there is a slight maximum in April, most crops can be started but cannot be finished without the aid of irrigation water. In the Jaffna limestone region, there is such an abundant supply of underground water that it is easy to produce crops all the year round, provided that the cultivator is willing to do hand-watering. Many of the wells in the areas containing the best soils are very deep by oriental standards, and the well-sweep is an integral part of the Jaffna landscape. Mechanical means of pumping the water are being applied, often by co-operative societies. The average plot, however, is small and the population dense, and care has to be taken that over-pumping does not draw brackish water into the well from the nearby sea.

A large amount of the rain which falls in Ceylon is entirely ineffective. The north-east and south-west quadrants of the hill country get far too much and a *maha* crop is often impossible because of floods ; a great deal of water runs to waste because it cannot be controlled on the hill slopes. Much of this water could be held back by suitable afforestation, to which insufficient attention has been paid during the last century. The regulation of this surplus water has to be considered side by side with the construction of the means for distributing it over the lowlands. Although this problem has received serious consideration during the last 10 or 15 years, and although the Irrigation Department now considers catchment basins as wholes, further study is still required. For every major scheme in the lowlands, there should be a corresponding superintended catchment area embracing the upper reaches of the rivers concerned ; the settlements in this area should be carefully controlled so that hill slopes are not denuded of trees. So far, there have been too few irrigation experts who possessed the wide knowledge of the country as a whole that would allow them to see these problems in perspective. Many of the irrigation engineers have been too highly specialised in one direction ; and they have had to learn about the country as they proceeded with their work. Owing to its inferior conditions of work, the Irrigation Department tends to lose its best men to the Public Works Department. Moreover, as the irrigation work has expanded continually, there have never been enough engineers.

ANCIENT IRRIGATION WORKS : ANURADHAPURA

The ancient irrigation works of Ceylon[8] are the pride of the Ceylonese. They are associated with the " Golden Age " (between about the 4th century B.C. and the 12th century A.D.) during which the country was ruled by Sinhalese kings whose work is perpetuated in the remarkable ruined buildings found in many parts of the island and notably at the two chief capital cities of Anuradhapura and Polonnaruwa. The former city dates back to at least the 5th century B.C. At that time the Wet Zone is believed to have been entirely undeveloped rain forest. The Dry Zone was gradually settled by the Sinhalese and developed a high standard of civilisation and culture. Owing to the system of "rajakariya"[9] the kings could command as much labour as they liked. By this system the people did actual work for the king in exchange for land tenure. In order to build some of the massive barrages for the reservoirs some thousands of men must have been employed on each. Curiously enough, all trace of their plans, tools and instruments have disappeared. At present, however, comparatively little archaeological or historical research has been done, and we cannot speculate on what the future may reveal.

---

[7] See Fig. 1 and E. K. Cook, *A Geography of Ceylon*, London, 1931 ; also S. F. de Silva, *The New Geography of Ceylon*, 4th edition, Colombo, 1945, pp. 191-204.

[8] See H. B. Codrington, *A Short History of Ceylon*, London, 1939 ; and R. L. Brohier, *Ancient Irrigation Works in Ceylon*, 3 vols., Colombo, 1934–36. Fig. 3 shows works in the Anuradhapura area.

A very fine chronicle, the Mahawansa,[10] has been preserved intact and notifies chronologically the construction of most of the schemes. Like many ancient documents it appears to exaggerate the number and magnitude of the works. The maps of the Ceylon Survey Department include all the works which, though overgrown with jungle, were recognisable by the surveyors: a complete revision has been made in recent years. The maps show over 12,000 reservoirs either abandoned or in use. All the principal works mentioned by name in the Mahawansa are easily recognisable.

The Sinhalese, who probably came from North India during the 6th century B.C., brought with them a knowledge of paddy cultivation, for which it was necessary to flood the fields. By the 3rd century B.C., and possibly even earlier, they had started making tanks. The earliest appear to have been in the neighbourhood of Anuradhapura, and were reservoirs made by erecting earth barrages across the valleys of the perennial rivers. The first to be mentioned in the Mahawansa is Abhayawewa, now identified as Basawakkulama Wewa. The nearby Tissa Wewa may have been built even earlier, in the 4th century B.C.[11] These two tanks, together with Nuwara Wewa of the first century B.C., are close to the city of Anuradhapura and supplied it with drinking and irrigation water. The river supplying these tanks is called the Malwatu Oya (Sinhalese). It rises on the northern edge of the hill country and reaches the sea a little to the south of Mannar Island under the Tamil name Aruvi Aru. (Duplication of name is common in this part of the island where Sinhalese and Tamil settlements overlap; and on the 1-in. maps we find that a number of the tanks have both Kulam and Wewa attached to their names, as in Basawakkulama Wewa).

---

[9] See Brohier, *op. cit.*, vol. I, pp. 19, 20 and vol. III, pp. 13, 15.

[10] There are a number of English translations—e.g., *Mahâvamsa*, trans. W. Geiger, London, 1912.

[11] G. C. Mendis, *Early History of Ceylon*, Calcutta, 1935.

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In the 5th century B.C., as the increasing population in the neighbourhood of Anuradhapura had caused excessive demands on the water of the Malwatu Oya, a very remarkable piece of work was done to augment the supply. The next river further south, the Kala Oya, has a much bigger volume of water; its headstreams rise much further south, in the hill country north of Matale where there is rain in every month of the year. In the region where this river emerges into the dry zone, there had already been constructed in the 5th century A.D. a bund 3½ miles long and between 36 and 58 ft. high which had caused the formation of two tanks, Kala Wewa and Balalu Wewa. The former of these was 7 square miles in area, and is one of the largest tanks. It watered a very large area of paddy land with the aid of a number of irrigation channels. The surplus water was carried to the tanks of the Malwatu Oya by means of a channel emerging from the north-west corner of Kala Wewa and crossing the divide between the two rivers. This channel, the Jaya Ganga, is one of the most remarkable works of the Sinhalese kings. It was 40 ft. wide, 54 miles long, and involved levelling which would be difficult for a modern engineer with all the convenient instruments which he has at his disposal; for 17 miles the fall is only 6 in. a mile. The Jaya Ganga joins Tissa Wewa and has branch channels to Nachchaduwa tank (constructed 9th century A.D.) and Nuwara Wewa, filling a number of small tanks en route. The work involved can best be envisaged by a study of the 1-in. map of the area, from which Fig. 3 has been compiled.

The lower course of the Kala Oya has the remains of numerous channels carrying water from the river to paddy lands. The Malwatu Oya also has a number of similar channels, but near its mouth is one of the most interesting of all the schemes in the island, constructed in the 6th or 7th century A.D. The site of the scheme is an extremely flat area with an annual rainfall of less than 50 in. The natural vegetation is thin thorn scrub. On the right bank a large irrigation channel has been taken off about 18 miles from the mouth. This leads to a large reservoir which has been made by building a huge earth barrage, 7½ miles long, which forms a sort of shallow pocket to hold back the water. On the seaward side of this barrage, a number of small tanks have been made in a similar way, all joined by channels to the large one which is known as Giant's Tank and which has an area of about 5 square miles. During the rainy season, which rarely lasts longer than the months of November and December, the sluice gates of the large bund are closed and the smaller tanks filled with rain water. Near the bund of each small tank is a village of paddy cultivators who get a crop from a patch of alluvial land below their tank. At the end of the paddy season the small tanks are empty but their beds are covered with silt brought in by the rain water. Meanwhile, Giant's Tank has been filled with water from the northern edge of the hill country. When the first paddy crop has been harvested, the beds of the smaller tanks are sown with paddy and watered from the channels joining them to Giant's Tank. Thus two paddy crops are normally

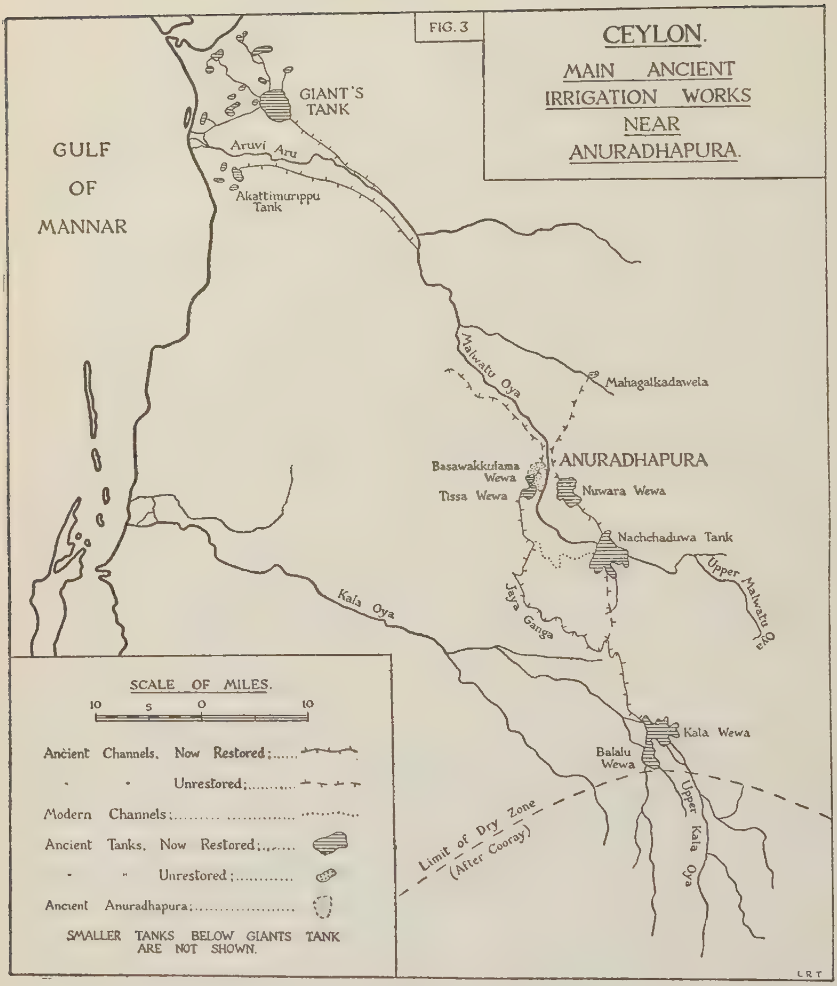
FIG. 3
CEYLON.
MAIN ANCIENT IRRIGATION WORKS NEAR ANURADHAPURA.
GULF OF MANNAR
GIANT'S TANK
Aruvi Aru
Akattimurippu Tank
Malwatu Oya
Mahagalkadawela
ANURADHAPURA
Basawakkulama Wewa
Tissa Wewa
Nuwara Wewa
Nachchaduwa Tank
Upper Malwatu Oya
Jaya Ganga
Kala Oya
Kala Wewa
Balalu Wewa
Upper Kala Oya
Limit of Dry Zone (After Cooray)
SCALE OF MILES.
10 5 0 10
Ancient Channels. Now Restored
Unrestored
Modern Channels
Ancient Tanks. Now Restored
Unrestored
Ancient Anuradhapura
SMALLER TANKS BELOW GIANTS TANK ARE NOT SHOWN.
LRT

Fig. 3.

obtained from land which is semi-desert. In the event of a drought in the Mannar district the rain-fed crop will fail, but the cultivators still have the advantage, via the Kala Oya, Jaya Ganga, Malwatu Oya and Giant's Tank, of the much more reliable rain from the northern edge of the hill country. The small rain-fed tanks are very similar to those of the neighbouring mainland of Madras. On the left bank of the Aruvi Aru there is a similar arrangement on a smaller scale with Akattimurippu Tank, which can only be fed after Giant's Tank is full, the right bank people having the prior right to water.[12]

After being in continuous use for several centuries, Anuradhapura was abandoned, because, it is said, of invasions of Tamils from India. The tank bunds fell out of repair, the water gradually emptied. When the Portuguese arrived during the 16th century the whole area covered by the tanks and the city had been invaded by jungle growth and forgotten. The great series of works in the Kala Oya and Malwatu Oya basins ceased to function.

ANCIENT IRRIGATION WORKS: OTHER AREAS[13]

A similar great series of works had been constructed elsewhere in the Dry Zone, and most of them ultimately suffered the same fate as their counterparts in the Anuradhapura area. One such series utilised the water of the Mahaweli Ganga basin. The Mahaweli Ganga, which is the largest river in Ceylon, is about as long as the Thames, but carries a great deal more water. It conveniently rises in the south-west of the hill country in the area of heaviest rainfall. The régime in this area is typified by that of Watawala (Fig. 2) whose mean annual rainfall is 218·6 in., nearly all of which falls during the south-west monsoon season. The averages for June, July and August are 38·7, 29·4 and 25·8 in., respectively. The Mahaweli Ganga is fed by hundreds of affluents, and carries a large supply of surplus water to the opposite edge of the hill country where it descends in a series of rapids to the flat eastern coastal plain. The north-eastern corner of the hill country has its rain at the opposite season, and is typified by St. Martin's Estate, Rangala (Fig. 2); there is, however, on this side a much more pronounced drought season; many places are virtually rainless for more than six months, and the affluents of the Mahaweli show great variations in level during the year. In the main stream, however, this effect is neutralised by the water coming from the south-west of the hill country. Beyond the hill country, the river has made for itself a huge flood plain where large areas of alluvial soil are suitable for paddy cultivation. In the immediate proximity of the river, however, floods are too frequent to allow of cultivation. It is, therefore, necessary to take the irrigation water to the higher parts of the flood plain and to allow "gallery forests" to develop on the lower lands.

---

[12] It has been suggested that the scheme be taken a stage further by draining Giant's Tank and growing paddy on its shallow floor, water being supplied from a reservoir formed by damming the Malwatu Oya higher up.

[13] See Brohier, *op. cit.*

From the point of the river's exit from the hill country, numerous schemes were developed by the Sinhalese kings ; all of them were abandoned after the fall of Polonnaruwa. Thus Mahaweli Ganga water was probably taken from Minipe by a channel which followed the left bank of the river, crossed its tributary, the Amban Ganga, and fed the great tank known as Parakrama Samudra—i.e., Parakrama's Sea. This is named after Parakrama Bahu the Great, who reigned in Polonnaruwa from about 1153 to about 1186. Polonnaruwa, in fact, lay on the eastern shore of the " sea." Amban Ganga water was, in turn, taken from a point further upstream, to feed a chain of tanks, the greatest being at Minneriya and Kantalai. This channel has been restored as far as Minneriya. From the 13th century onwards, unfortunately, this whole lower Mahaweli area has become one of the worst malarial areas in the island. When the floods subside, any depressions in the land are left filled with stagnant water ; these are commonly known as *villus*. Some of them are as much as a square mile in extent even in the dry season.

Other works, but generally on a smaller scale, used the waters of other rivers draining to the east and south-east coasts.

Drought in the History of Ceylon

The question of drought in Ceylon has never received much attention. To the outside world Ceylon is a wet country. For several hundred years after the " Golden Age " the areas most liable to drought were more or less abandoned by the indigenous population and ignored by the administration. The drought of 1934 which was followed by a disastrous malaria epidemic[14] called attention to the fact that Ceylon is liable to serious deficiencies of rainfall which may even spread to the Wet Zone. Previous to 1934, irrigation works were being restored and efforts were being made to encourage settlement in the Dry Zone, but this must have been during a wet rain cycle when the idea of drought had been forgotten. Of over 300 rainfall stations in Ceylon, about 90 per cent. are in the Wet Zone. More than half of the observations are made by private individuals on estates.

By comparison with similar areas, however, it seems likely that spasmodic drought is a characteristic of the climate of the Dry Zone. There are references to drought in the Mahawansa—e.g. :

> " At that time the misery of drought prevailed here in Varadipa. When the Conqueror Konagamana knew of this misery, then, to bring it to an end, and afterwards to achieve the converting of beings and progress of doctrine in this island, he, urged on by the might of his compassion, came through the air, surrounded by 30,000 [disciples] like to himself, and stood upon the Sumanakuta-mountain.[15] By the power of the Sambuddha the drought came to an end, and from the time that the decline of the doctrine ceased rainfall in due season now began."[16]

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[14] See C. L. Dunn, *Malaria in Ceylon*, London, 1936.

[15] Adam's Peak.

[16] p. 104 in Geiger's translation.

Very little research has been done on the historical geography of Ceylon. A study of the references to drought in historical literature would be most illuminating. It has been generally accepted[17] that the depopulation of the Dry Zone was due to invasions, particularly those of the Tamils previous to the 15th century. No doubt the invaders would breach the bunds of certain tanks for strategic reasons, but the Walawe Ganga has in its course the remains of over 700 large and small tanks. It is hardly likely that an invading army would take the trouble to smash the bund of every one of these tanks, especially as it had to feed off the countryside. Many people must, of course, have fled in fear before the invaders, but if invasion were all, they would be likely to return later to their own lands. Having had the opportunity of studying the Dry Zone after five years of very insufficient rainfall in 1934–1940, the author is of the opinion that drought is far more likely to have been the fundamental cause of the exodus. With a long enough spell of deficient rainfall and emigration, the decay of the organisation which had been developed by the Sinhalese kings for the maintenance of works would make it impossible for the emigrants to return. Even in the case of minor tanks it would be most difficult to get them in order again, since the people would not be able to feed themselves while the works were in progress.

At a later date, Knox made a very interesting reference to drought in his well-known account of his captivity and adventures in late 17th-century Ceylon. He and his compatriots, who were detained by the Kandyan king, used to carry on trade in the *Wanni*, the name given to the wild parts in the north after their depopulation. He says :

> " Some eight or nine years one after another we carried on this trade. . . . Three or four years together the dry weather prevented us ; when the country was almost starved for want of rain : all the time they never tilled the ground. The wells were almost dry ; so that in the towns we could scarcely get water to drink, or victuals to eat ; which affrighted us at those times from running into the woods, lest we might perish for thirst. All this while upon the mountains, where our dwelling was, there was no want of rain."[18]

In modern times of drought the people have only been persuaded to remain on such lands as were inhabited by the organisation of elaborate government relief works.[19] The opportunity was taken by the government to get them to repair the smaller tank bunds and to make a number of jungle roads which would otherwise not have been constructed. They were paid for their work, and food was supplied at various centres. Though many of them were already too emaciated by hunger and malaria to do very much work, their self-respect as landowners was preserved and they were prevented from wandering about the country.

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[17] H. I. S. Thirlaway, however, blames soil erosion and the siltation of tanks. See his paper on " Ruhuna and Soil Conservation," *Loris Journal* (Colombo), vol. III, 1945, pp. 1–5.

[18] Robert Knox, *An Account of the Captivity of Capt. R. Knox in the Island of Ceylon*, London, 1818, p. 263. There are many other editions, some under the title, " An Historical Relation of Ceylon."

[19] For recent colonisation of the Dry Zone, see Farmer, *op. cit.*, pp. 62–66.

GEOGRAPHY AND SOCIAL STUDIES IN U.S.A.*

N. V. SCARFE

GEOGRAPHY is a neglected subject in U.S.A., especially in the secondary schools. In view of the high repute enjoyed by the subject in some American Universities and the large extent to which geographers serve in Governmental departments this neglect in schools may seem difficult to understand, but the situation has developed quite naturally, according to G. T. Renner.

"After the young American nation acquired its vast western territory it became imperative to prospect the new domain for mineral wealth and to classify all public lands in order to guide settlement. Accordingly Congress, after encouraging several preliminary explorations, authorised various Geological and Geographical surveys of the western territories. Several able geologists were available, and the geological work went ahead vigorously. Unfortunately, however, there were no geographers in the young nation to classify the public lands and make recommendations for a wise programme of settlement and development. Accordingly, as the geologists were reluctant to let the appropriations for geographical work lapse, but were unwilling to send to Europe to procure geographers, they simply decided to define geography as 'the superficial aspects of geology' and use all of the appropriations. Soon after this, in 1879, the geographical part of the survey's title was dropped. As a result of all this a wrong idea of geography was created in the United States; it came to be regarded as a physical study rather than a man-and-environment science. In the guise of physiographic or topographic geology it was introduced into American elementary, secondary, and higher education, where in most instances it dwindled until it became a mere physical description of the earth's surface to which were added lists of political units, boundaries, and place names. This was, of course, not geography as now understood, but unfortunately a belief that it was geography became deeply fixed in American minds. Also, because of the activities of topographic surveyors and engineers on the Geological Survey, the curious notion that geography is map making also became widespread. Furthermore, erroneous use of the word *geographic* as a synonym for *areal* or *spatial* became a commonplace in the United States."

"Most Americans alive to-day thus grew up under teachers who did not know what geography was and who defined it in such a way as to give the subject only minor educational significance. Even many dictionaries defined the word in a way in which no modern geographer would agree."

"These errors in thinking about geography resulted in a general neglect of that field in education and caused American educators to place an overemphasis upon history and the institutional social sciences,

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*Being the substance of an address delivered to the Annual Conference of the Association, 1950.

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which, in their turn, have given education in the United States its peculiar bias which renders so many educated Americans singularly inept in dealing with geopolitical, geoeconomic, and geocultural problems. What is equally important, the geographic study and classification of land in the United States remained unaccomplished. As a consequence, many extremely serious national and State mistakes in settlement, land use, and management of natural resources were made in the course of the nation's development."

Overemphasis on history and social studies still persists, and herein lies the greatest present opposition to a revival of geography. It seems, incongruously enough, to result from the environment in which this young nation grew. Conquering a great continent demanded great human energy and initiative, and success depended mainly on the sort of person the pioneer was and not on the kind of land or climate he conquered. So much of the enormous central plain is uniform in physical conditions that it was natural that human action and effort were stressed. Man's power over nature mattered ; nature seemed to have little influence over man. Not till recent years was a man's failure attributed to drought or cold or altitude rather than to human incompetence. In this connection it is interesting that history has not quite the same pride of place over geography in California as it has in the Middle West. To achieve success in California it matters as much where you are as who you are ! This does not mean that geography is as yet a dominant study there, for success in America as a whole still depends more on knowing the right people than on knowing the right information. As long as American people revere social popularity as highly as they do, their education will always tend to stress the importance of training in character, in acceptable social behaviour and in citizenship rather than the attainment of scholarship and academic distinction. Social Studies thus naturally caught on very quickly in U.S.A., and very easily took over the human aspects of geography, leaving the physical aspects as earth science for those interested in geology. History and social studies have therefore disrupted the essential synthesis that geography provides.

All this was most unsatisfactory, but in the early years of the 20th century a number of young Americans studied geography in European universities, and when they returned to the United States they trained a whole generation of American geographers. The work and educational literature of these latter now exceed the product of the geographers of any other country. American geographers are, however, hampered at every turn by the traditional American misinformation on things geographic and thwarted by the hangover of a misdefinition which still persists even in the minds of many educators who should know better. The inertia of the old American misconception of geography was so great that, in 1906, Robinson, Whitbeck and others proposed in all seriousness that a new name be coined for geography in order to make certain university administrators more receptive to the idea of teaching this essential social science. Geographers have, however, preferred to battle the issue out openly on its own merits, and have been slowly gaining ground.

There are, however, some signs of a resurgence of interest in the subject. This has been due to the effects of the war, to the vital interest that Americans take in world affairs, and to the way in which nature with its floods, droughts and soil erosion has hit back at all-conquering man. In spite of a great reverence for history the practical American knows full well that a knowledge of history will not help him win the next war. As George T. Renner wrote recently :

> " If the recent war taught us anything at all it was that geographic education is an absolute ' must ' during wartime. What many of our educators are refusing to face is that it is even more essential in peacetime. If we are ever going to have world peace it will be because we have educated our people to understand better the other peoples of the earth, and this must rest upon the ability to think geographically. By this is meant the ability to regard peoples in the light of their specific environments."

Again, shortly after the close of the recent war, the president of Johns Hopkins University, the late Dr. Isaiah Bowman, wrote :—

> " One of the oldest of sciences, geography, is now receiving general recognition in the universities of the United States. Once more it plays a part in general education as it did in the earlier curricula of the universities devoted to both professional and humanistic learning. The geographical point of view is indispensable in to-day's world of speed and power. No part of the world is unimportant ; no territory, however small or remote, is negligible. The dynamicism of the modern world of power, production, trade, and diversified culture is not expressed in the old formulas."

Another illustration of this resurgence of interest is given by Dwayne Orton, an official of International Business Machines Corporation, who declared, " Education to match these times will require a bold world-wide outlook permeating all its work—Geography must become global. The emphasis of the old geography must give way to air-age views which reveal the impossibility of physical isolation for America."

Bowman's statement is far too optimistic, for geography is almost entirely absent from the secondary schools and is even now continuing to disappear from the elementary schools. It is, as he asserts, gaining ground since the war in the State universities and in a few of the private universities, but even there it is usually a mere elective required in few if any educational programmes. Where geography is taught by trained men, and where the students are left free to elect courses in it, there is usually a tremendous student enthusiasm for the subject. But the vast majority of students are blocked out of courses in geography by systems of requirements and preferred electives.

A few outstanding Americans have, however, succeeded in presenting geography as a new and vital study for schools and so have not only successfully combated the absorption of a pseudo-geography into social studies but have established geography firmly in the time table. The efforts of these few have interest for Britain, as they have done no more and no less than apply what Mr. E. W. Gilbert calls " Mackinder's Seven Lamps of Geography " very rigidly to the study of the subject in school. They have rethought very carefully their definitions of the content and purpose of geography, and given great care to the methods of teaching it. They have given the subject a scholarly discipline. I propose briefly to outline the arguments that have weighed with them.

They say that geography, like any other content subject of the school curriculum, has to align itself very closely and functionally to the purpose of education as a whole as now accepted in U.S.A. Education has primarily to serve the purposes of American society and perpetuate the American way of life ; it has to be demonstrably useful in the widest sense. It has to have practical value. They say that all information taught in school has to be significant and meaningful to the child. Mere description for its own sake is rejected.

Education in America is thought of as the study of relationships. In this connection it is interesting to recall one of Mackinder's dictums. " There are few joys greater than the intellectual joy of suddenly seeing the correlation of things which beforehand were detached." Three main types of relationships which education should consider are distinguished. The first is the relationships between one set of natural conditions and another ; this they call natural or physical science. The second is the relationships between one set of man-made conditions and another—social science. The third concerns itself with the relationships between man-made circumstances and natural conditions and is called geography. Geography in U.S.A. is also a science for if interpreted in this way it is human ecology. It fits into the American outlook for it tries to relate natural science with social science in order to show the significance of environmental conditions to man's life and work. As one pupil in Oregon put it, " geography is the science which makes other sciences useful." By this he apparently meant that geography is the science which studies the social significance of the findings of natural science. Natural and social science are envisaged as pure sciences studied for their own sake.

Interpreted in this way, American geography is not one of the social sciences, even though it serves the purposes of a socially functional general education. It does more than social science can strictly perform because it relates natural and social science. It provides a wider synthesis than can social science. Though there is every reason for including history, sociology, religion, psychology, politics, economics and literature in social science, they say it is impossible to include geography without also including all the natural sciences.

In America geography, if it is to be useful, cannot be split up into social and physical aspects. The essence of the subject is the relationship of the two aspects, not their separation. The only legitimate means of itemising the study is by dividing the world into regions. Regional, geography with emphasis on a real differentiation is according to Preston James, the only type of geography likely to combat the social studies octopus.

Not all regions, not all kinds of relationships, are equally easy to understand, and therefore relationships have had to be graded to suit the growing child from the simple climate-clothes relationship to the highly complex set of relationships in an industrial city.* In doing this American geographers are a long step ahead of the advocates of social studies who have not yet been able to distinguish adult concepts from simple concepts comprehensible to children. Regions, too, of any magnitude are difficult for young children to comprehend. Early studies are of small sample areas, and the child is only gradually introduced to the study of larger regions, countries, world regions and finally the world as a whole.

Not all regions, nor all relationships are of equal value nor of equal social significance to the future American citizen. The teacher has to be ruthlessly selective in rejecting material that does not have a direct bearing on the particular needs of the children. Geography must offer a partial explanation or solution of a social or political problem. Many lessons start with a stimulating social problem which will arrest the attention of the children.

As has already been said, school in America is not solely a place where significant information is acquired, it is also a place where socially desirable attitudes and character are developed. Social growth is as important as intellectual growth. Geography has an important function in fostering international understanding. It should develop tolerance and sympathy. " In the modern world," according to G. T. Renner, " people need to acquire the ability of seeing themselves through the eyes of others ; they need to like other people ; they need to know enough to make other people's actions seem reasonable. Geography is the basis for all education for peace."

This attitude is conditioning the modern approach to the teaching of geography in school. The teacher has to be ruthlessly selective in rejecting material and methods which will not encourage right social attitudes. Edith Parker states very clearly that children must realise the meaning of what they learn to their lives, but she goes on to say that mere knowledge is useless unless it helps them to reach the accurate conclusions needed as a basis for deeper insight and wiser action. " We need experiences that help us to overcome the tendency to act on a basis of emotion rather than reasoning. Children must be thinking individuals, delaying judgment until evidence is sifted."

Unless geography is presented in such a way that thinking is demanded it cannot claim to be exercising a useful function in education. Thus a favourite method of approach in U.S.A. is the problem method, employing a research technique in the solution of the problem. Having selected as a unifying theme some social or political problem in a chosen region, and having assured herself that the solution of the problem will have functional significance for her children, the teacher's next task is to emphasise those aspects which will develop tolerance and sympathy. To carry out the research technique it is necessary to turn the geography room into a laboratory, and to provide a lively variety of material on which children may work. Not only has the teacher to arrange conditions so that the pupils naturally want to learn, she has also to select materials so that the children can, in fact, find out what they want to learn for themselves. Further she has to organise their efforts so that children achieve their aim with the minimum of useless effort. Labour saving enters into every aspect of American life.

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* See E. P. Parker. 32nd Year Book. National Society for the Study of Education. 1934.

The teacher is in no sense a dictator when she sets appropriate exercises and questions to guide the children in their original investigations or in their organisation, classification and selection of relevant material. In doing this, however, she is going strongly against the normal methods of teachers of social studies in America, who give children far greater freedom to go astray, and require children to waste too much time in making their own immature and unsatisfying plans. The efficiency of the geographer, with a clear point of view, a progressive connected scheme allowing for child growth, and an emphais on reality, is beginning to make a very sharp appeal to Americans.*

This new geography, closely related to the main theme of education, presenting a clean-cut contribution to the solution of social problems, and using methods which are both efficient and attractive to children, is beginning to oust the muddled vagueness which proceeded without any special point of view to disintegrate geography in order to make an historian's social holiday.

The result of the rethinking which has taken place in U.S.A. is seen in the gradual devolution of social studies from a *muddled*, unconnected series of projects to the *separate* treatment of *topics* historically and geographically and later to the separate treatment of *regions* geographically and historically.

Here it is important to give the American definition of the hackneyed word " integration," because much harm has been done by the mistaken use of the term. Integration in education happens when knowledge and skills from various sources are *applied* to a new problem. Integration is what occurs in a child's mind, it is not imposed by any artificial means. It is quite clear, too, that knowledge has first to be acquired before it can be applied.

Analogies may be dangerous, but if we compare the slow comprehension of civilised life around him by a child growing from 7–15 years, with a novice's attempt to drive a new car, we can perhaps get a clearer picture of the place where integration should occur in American school life. A novice's first view of a motor-car is certainly of the whole car and of its bewildering array of complicated and apparently unrelated parts. At first it is impossible to select the more from the less significant levers and parts for making the vehicle work. For a young child,

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*See " Geographic Approaches to Social Education " by H. J. Warman, in *Geography*, March, 1950, pp. 32-37.

society and the world around must be a bewildering maze of complications all of which may be interesting, but he has little guide as to the relative significance of any one fact in helping him live his life satisfactorily.

The novice has to set out, under guidance, to analyse the various parts of the car separately, and to discover how each part contributes to the eventual movement of the machine. The child has similarly to analyse and study each separate factor that seems to influence civilised life around him. Not until the novice has completed his analysis of the car and selected the significant levers, can he begin to bring all the functions of the car into co-ordinated operation and make it go. Not until the child has some working knowledge of the various factors which influence the actions of society around him, can he hope to understand future problems. What the driver of a car does in traffic is a fine example of integration or applied learning. What an adult should do is to apply the analyses of school work to the understanding of that integrated complication which is society as a going concern. If we and the Americans are unwilling in law to allow a youth under the age of 16 to carry out the physical integrated acts of driving a car, it is possible that 16 is a suitable age for the integration which advocates of social studies seem to want. Certainly on psychological grounds the age of 9–16 is the age of realistic and utilitarian analysis and selection. It is the age when separation, not isolation, of school subjects is right. In the early stages of junior school separate subjects do not exist for selective analysis of the world around has not had time to develop. The stage when subjects should come together to be applied to the adult social and political problems of the day is in the 10th, 11th and 12th grades of the American High School (roughly corresponding to an English sixth form).

In any school there should be a conclusion to school studies in the form of an integrated last year or last term. Any good book has a conclusion. A school course is not unlike the drama of a good story, where each chapter though separate contributes something vital to the progressive growth of the argument. The conclusion, showing what all the rest has been for, is essential. It ties all the preceding work together, and may leave something of value which can be applied to other situations in life.

These arguments which seem to criticise adversely the modern concept of social studies, both in England and America, might be said by the uninitiated to apply equally to geography as here described. The answer is, of course, that geographers deal largely with descriptive material at early ages and leave complex integration till later, but the teacher always has the final integration in mind. The demonstration of simple relationships, however, is not integration ; it is training in a point of view and in thinking. Correlation and integration are not the same thing. Integration attempted too soon merely leads to confusion. The recognition of relationships is part of the educative process.

This survey of the reasons for the neglect of geography as a separate subject in American schools has shown that, though historical and even geographical factors have played an important part, the chief cause is the over-emphasis on apparently useful but ill-conceived social studies. Further it has been shown that as a result of some profound thinking about geography and social studies Americans are coming to the conclusion that there is a place for both geography and social studies in school. There is a feeling that all education is in fact social studies, and that all subjects should have social significance, or even a social bias. Certainly the careful reconsideration of the content, purpose and function of geography, together with the application of modern psychology to its teaching seem to be the means of resuscitating the subject in the school. If there are any lessons for Britain from this survey they are that (i) we must be stricter in our interpretation of the subject, and so give it a scholarly discipline, (ii) we must insist on the social relevance of the facts we teach and (iii) we must help the social scientist achieve a similarly clear and accurate idea of the content, purpose and function of his own subject, so that there is some progressive and connected order in the growth of sociological ideas in the child's mind. No one now believes in teaching any subject in complete isolation or in total disregard of the real world of the child's experience, geographers least of all, but there seems little point in muddling haphazardly oddments from various subjects into disconnected units, or in forcing adult ways of thought on to children too early.

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J. A. Taylor *

In south-west Lancashire two major agricultural regions may be distinguished :— (See Fig. 1).

(i) an arable region which occupies the western part of the plain from the Ribble Estuary to the Mersey, and from the Douglas-Glazebrook valley to the Irish Sea :

(ii) a grass belt which occupies the easternmost parts of the plain and the western and southern foothills of the Rossendale upland.

The arable region is concerned mainly with the production of cash crops such as potatoes, wheat, cabbages and peas. Oats and rotation grass are also prominent but acreages of permanent grass are very small. The dominance of arable is due to both physical and economic factors. The soils on the Shirdley Hill Sands[1] and peat are relatively light and responsive to good manurial treatment. Moreover the area lies in the rainshadow of the North Wales upland and its summers are consequently more sunny and less cloudy than is usual for the west of Britain. Further, there is a large market for agricultural produce in the nearby industrial centres of South Lancashire.

Here also is a large, stable milk market supplied by farms in the second agricultural region, the grass belt. These farms are engaged primarily in the production of liquid milk and eggs for sale. The soils in the grass belt are chiefly derived from boulder clay and are more suited to grass than to arable. Moreover the land is higher and rainfall heavier ; summers are less sunny than on the western parts of the plain. Arable acreages are consequently limited and are usually devoted to the more tolerant oats and hay which are required for fodder.

In Fig. 1[2] the boundary between the arable and grass regions is shown by a single line. However, a detailed examination of the boundary on available agricultural maps (e.g., L.U.S. Sheets 29, 35 and 36 of the 1931–2 survey) reveals a transitional belt or " borderland " of mixed character. This borderland presents several features of interest. The first is its definition in relation to physique. The arable region and the grass belt have been developed on contrasting soils and, up to a point, in contrasting climates. The borderland is situated where the sands and peat of the plain to the south-west give place to the clays of the rising, undulating country to the north-east. Accompanying this change in the character of the soil is a gradual

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*Mr. Taylor has experience as a grammar school teacher and is now assistant lecturer in the Department of Geography and Anthropology, University College of Wales, Aberystwyth. He has presented a successful higher-degree thesis on " Mossland farming in Southwest Lancashire " to the University of Liverpool.

[1] These are post-glacial wind blown sands.

[2] Fig. 1 is based on Fig. 5, " Land Use Regions of Lancashire "—Land of Britain (L.U.S.) Part 45, W. Smith.

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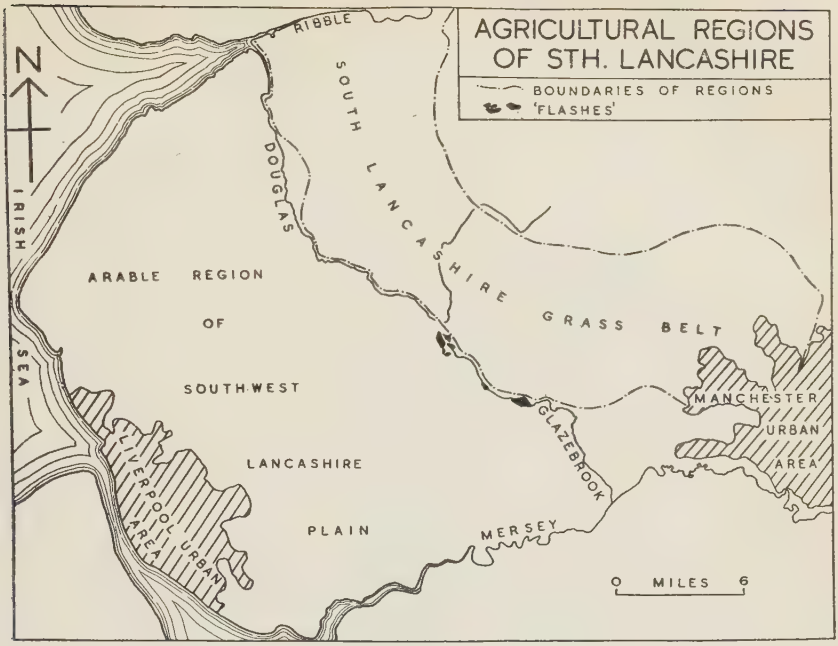

Fig. 1.

but perceptible deterioration in climate so far as arable farming is concerned ; rainfall increases, cloud increases, sunshine decreases and temperatures generally decrease except in midsummer. The second feature of interest is the fluctuation in the precise position of the borderland (for it has not been constant) according to the profitability or otherwise of arable farming on the one hand and grass farming on the other. When arable farming flourishes the borderland may be expected to have a north-easterly location because of the expansion north-eastwards of the arable. Alternatively, when grass farming flourishes, the borderland may be expected to have a south-westerly location because of the expansion south-westwards of the grass. Illustrations of these periodic shifts in the position of the borderland are given in the following discussion which takes the form of an analysis of field-to-field surveys at two particular dates, 1931–2 and 1944. The 1931–2 survey is that of the Land Utilisation Survey ; that of 1944 was made by the writer. Economic conditions at the two dates provide an extremely interesting and desirable contrast. At the earlier date, 1931–2, the world depression was at its depth and most branches of farming, especially arable, were on the decline with the exception of milk production which remained a fairly profitable industry. But twelve or so years later, in 1944, the world war (1939–45) was at its height and, with Britain still very dependent on home-produced foodstuffs, arable farming in particular (as well as other branches of farming) was enjoying a remarkable prosperity.

A definition of the borderland at the two dates has been attempted in Figs. 2 and 3. The following method of definition was employed.

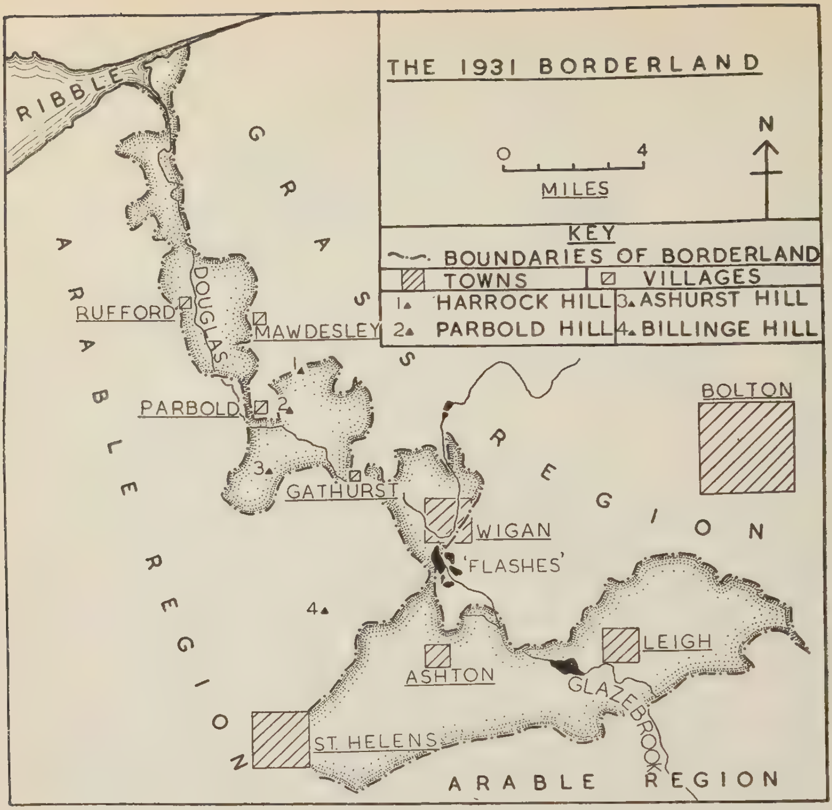
THE 1931 BORDERLAND
0 4
MILES
N
KEY
BOUNDARIES OF BORDERLAND
TOWNS
VILLAGES
1▲ HARROCK HILL
2▲ PARBOLD HILL
3▲ ASHURST HILL
4▲ BILLINGE HILL
RIBBLE
GRASS REGION
ARABLE REGION
RUFFORD
DOUGLAS
MAWDESLEY
PARBOLD
GATHURST
BOLTON
WIGAN
'FLASHES'
LEIGH
ASHTON
GLAZEBROOK
ST. HELENS
ARABLE REGION
1
2
3
4

FIG. 2.

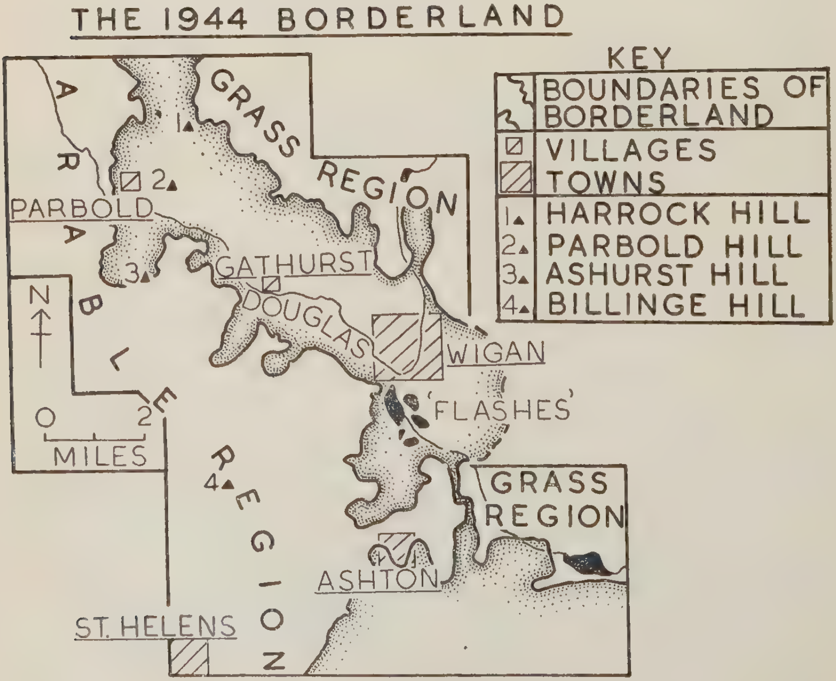
THE 1944 BORDERLAND
KEY
BOUNDARIES OF BORDERLAND
VILLAGES
TOWNS
1▲ HARROCK HILL
2▲ PARBOLD HILL
3▲ ASHURST HILL
4▲ BILLINGE HILL
ARABLE REGION
GRASS REGION
PARBOLD
GATHURST
DOUGLAS
WIGAN
'FLASHES'
GRASS REGION
ASHTON
ST. HELENS
N
0 2
MILES
1
2
3
4

FIG. 3.

Each region has a characteristic agricultural landscape. When, during examination, a point was reached in either the arable region or grass region where that characteristic landscape began to lose its essential uniformity and was no longer present, then the limit of the region in question was held to have been passed. Between limits thus determined lay the borderland which is neither distinctively arable nor distinctively grass.

THE 1931 BORDERLAND (FIG. 2)

The 1931 borderland formed an irregular, interrupted, north-west-south-east belt coinciding generally with the Douglas-Glazebrook valley. Its position and dimensions were largely determined by the local pattern of the physical geography and, to a lesser degree, by the local operation of economic factors.

In several places the influence of relief on the position of boundaries could be traced. Near Parbold village, the borderland was completely severed. This break was due in no small measure to the sudden change in level at this point. The fertile Hoscar plain, mostly in arable, rises quite sharply to the relatively barren Parbold slopes, mostly under grass. Moreover, the alluvial soils of the Hoscar plain are deep and rich in contrast to the thin, poor soils of the Parbold slopes. A second instance of the effects of relief on the shape of the borderland was afforded by the Ashurst-Billinge ridge. This ridge is highest at its northern and southern extremities and lowest in the centre near Upholland village. Consequently the arable extended further across the saddle of the ridge than it did across the northern and, to a lesser degree, the southern parts of the ridge. The southern end of the ridge had more arable than the northern end because of the difference in the aspect. The south-facing slopes at the southern end of the ridge have more arable than the north-facing slopes at the northern end. The eastward extension of the arable across the central, and to a lesser degree, the southern parts of the ridge, greatly reduced the width of the borderland in this area. It was narrowest near Gathurst on the Douglas.

The width and shape of the borderland were often determined by changes in the nature of the soil. For example, that northern part of the borderland between the mouth of the Douglas and Parbold village lay in lowland country where relief is uniform and the only major physical factor influencing the local arable-grass pattern is soil. As a general rule, where soils are derived from sands and peats, arable farming was dominant; where they are based on clays, grass farming was dominant. For example, the sinuosity of the arable boundary north of Rufford is due to the irregularities of the boundary between the sands and peat to the west and the clay to the east. Similarly the Ashurst-Billinge ridge coincides broadly with the limits of the arable region and at the same time with the limits of the sands and peat typical of the plain. Comparatively little sand or peat (of the lowland type) occurs north-east of this ridge.

Local microclimatic factors also play a part in some areas. The

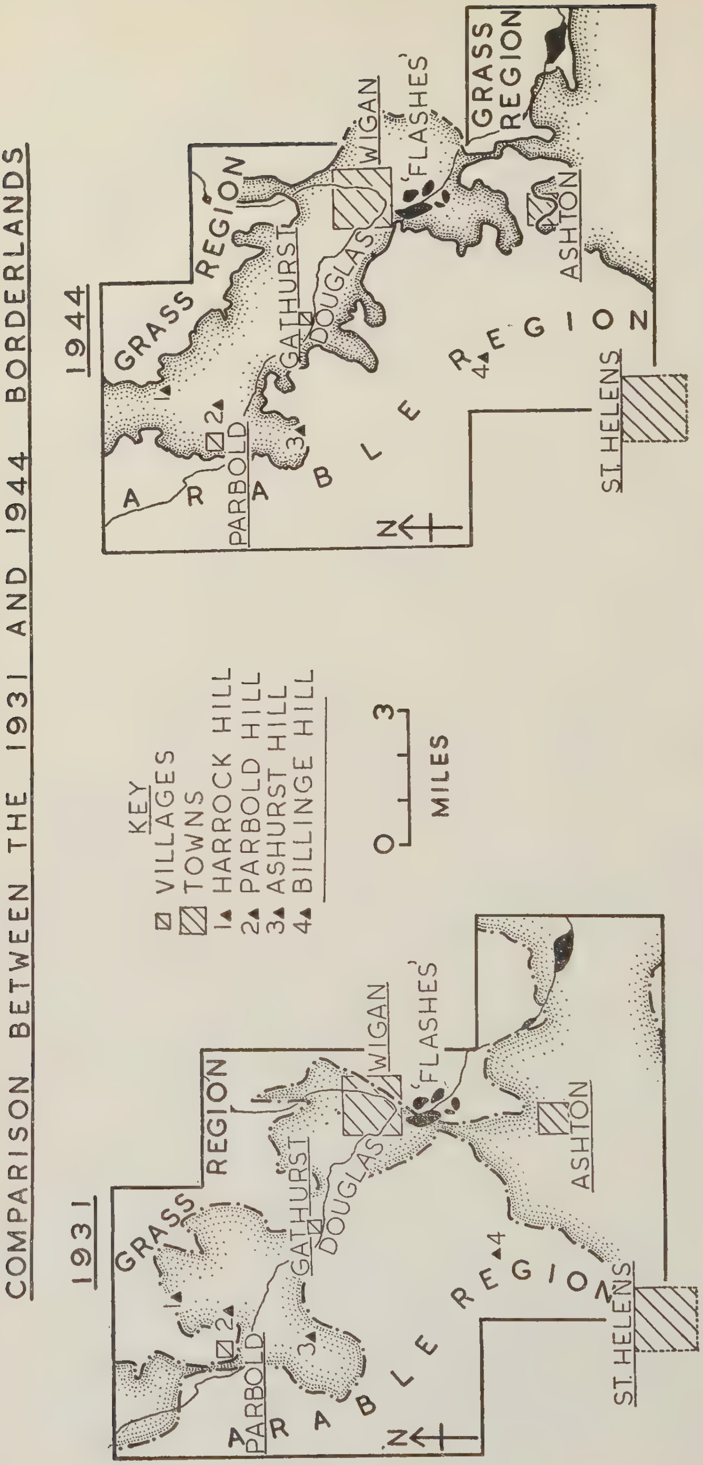
COMPARISON BETWEEN THE 1931 AND 1944 BORDERLANDS
1931
1944
GRASS REGION
ARABLE REGION
PARBOLD
GATHURST
DOUGLAS
WIGAN
'FLASHES'
ASHTON
ST. HELENS
N
1
2
3
4
KEY
VILLAGES
TOWNS
1 HARROCK HILL
2 PARBOLD HILL
3 ASHURST HILL
4 BILLINGE HILL
0
3
MILES

Fig. 4.

northerly slopes of Ashurst Beacon, the northern knoll of the Ashurst-Billinge ridge, carried a mixed type of farming with arable not particularly prominent. This is not surprising in view of the aspect and position of these slopes. Apart from their being at a disadvantage with regard to the sun, they also receive the full effects of the cool or cold north-westerlies, which come in behind depressions and funnel through the gap between Ashurst Beacon and Parbold Hill. Should sea breezes reach so far inland, however, they would be beneficial.

Man-made factors have also influenced the position of boundaries. The extension of the arable region across the central and to a lesser degree the southern parts of the Ashurst-Billinge ridge reaches the grass boundary just south of Wigan. Here, mining has caused subsidence which in its turn has impeded drainage and created artificial lakes, known as " flashes," and considerable stretches of wet, heavy, badly-drained land which is left under grass if farmed at all. Again, industrial atmospheres are not generally favourable to arable production or to grass maintenance for that matter, but grass is tolerated at a lower level of productivity than arable. Consequently, arable acreages near industrial centres are usually at a minimum. This applies particularly to the Wigan area and to the St. Helens area, especially to the east of the town which is often the leeward side and receives smoke and fumes carried eastwards by the westerlies.

Economic factors may also exert local influence on the position of boundaries, but their main effect is seen in the position of the borderland as a whole. Because of the profitability of milk production and the unprofitability of arable farming (in 1931–2), grass acreages were at a maximum and arable at a minimum. The borderland, therefore, was situated well to the south-west and partly on the plain proper. The local operation of economic factors is in evidence near population centres where the availability of a good safe market for milk and eggs favoured dairy farming and poultry keeping, rather than the growth of arable crops, on land of moderate productivity.

THE 1944 BORDERLAND (FIGS. 3 AND 4)

The survey for 1944 covered a smaller area than the earlier one and excluded the northern and southern extremities of the 1931 borderland, but, on the other hand, was of a more intensive nature. The same principles of regional analysis adopted for 1931 were applied in 1944, but the boundaries could be more finely drawn since more detailed information was available concerning the crops grown in each particular field of the arable. Special care was taken to assure that the boundaries showed the limits of *pure* arable farming and *pure* grass farming. This was more difficult in 1944 than in 1931–2. During the war (1939–45) all dairy farms in the grass belt were obliged to grow more fodder crops. Consequently, arable cropping spread north-eastwards from the fringes of the south-west Lancashire plain, but this was an expansion of oat and hay production rather than a conversion to pure arable farming or cash-cropping of the south-west Lancashire type. The limits of the latter are indicated by the arable boundary (see Fig. 3). Immediately north-east is the borderland characterised by a general north-eastward increase in oat and hay production and a marked decrease in wheat and potato production. Only when the latter had decreased to such limited amounts as to be confined to small, favoured locations was the grass boundary inserted. The grass region thus defined is typified by a varied landscape of permanent grassland and grass in rotation interspersed with fodder crops and, on occasion, arable crops for sale.

In Fig. 3, the 1944 borderland is an irregular north-west-south-east belt broken at one point near Abram and thus divided into two sections. The northern section is centred on the middle Douglas and its flanking low-hill country ; the southern section extends generally between Ashton and Kenyon and between Haydock and Leigh.

The effects of specific physical and economic factors on the position and shape of the borderland were again in evidence. In the main, the borderland had shifted north-eastwards compared with its 1931 counterpart as a result of the war-time spread of the arable at the expense of the grass. However, boundaries had not changed in all parts of the zone between 1931–32 and 1944. In some places physical factors prevented any north-eastward spread of the arable ; they anchored the boundary whatever the economic conditions. Examples of this occur at Parbold and at the Douglas Gorge, north of Wigan. At Parbold the forbidding upper slopes of the Parbold-Harrock Hills remained for the most part in grass despite the eastward spread of the arable across the Douglas and up the lower slopes, although this spread was so great that the 1944 arable boundary just south of Mawdesley was actually located to the east of the 1931 grass boundary (see Fig. 4). In the area of the Douglas Gorge, the 1944 grass boundary coincided very closely with the 1931 grass boundary (see Figs. 2, 3 and 4). The steep-wooded slopes and restricted marshy floor of the gorge would not permit any arable farming.

Wherever local physical and economic conditions were tolerably suitable however, arable of the south-west Lancashire type expanded north-eastwards. Illustrations occur on the Hoscar plain west of Parbold, and on the northern slopes of Ashurst Beacon. Many parts of the Douglas alluvial plain at Hoscar were skilfully drained to produce a vast expanse of oats and some of the lighter clays to the east carried wheat, potatoes and vegetables. Hence the shift eastwards of the 1944 arable boundary in this area. Again, on the northerly slopes of Ashurst Beacon arable farming of the south-west Lancashire type had developed on such a scale as to cause the 1944 arable boundary to lie well to the east of its 1931 counterpart.

Conclusions—(see Fig. 4).

Firstly, in 1944 as compared with 1931–2, a general shift north-eastwards in the position of the borderland had taken place as a result of the war-time emphasis on arable production and the consequent expansion north-eastwards of the arable wherever conditions were tolerably suitable. This was in contrast to 1931 when arable farming was discouraged by low prices and when the borderland had a more south-westerly location. Secondly, in 1944, a general narrowing of the borderland was in evidence; this was usually a result of the north-eastward advance of the arable boundary together with a more restricted retreat of the grass boundary. This migration was restricted because of the more rapid general deterioration of conditions in relation to arable farming as one approaches Rossendale. But in three places the borderland had widened—near Parbold, near Gathurst and in the "flashes" area south of Wigan. In all three cases the broadening resulted from a marked north-eastward shift of the grass boundary while the arable boundary moved very little. Thirdly, in 1944 as compared with 1931, there was a general simplification of the shape of the borderland, but also a general increase in the number and variety of local irregularities of regional boundaries. Of course, the 1944 boundaries were drawn from a more detailed survey, but many of the irregularities, in particular of the arable boundary were a result of the pressure of the arable which trespassed north-eastwards at every opportunity. Finally, it was local physical and economic conditions (especially the former) which largely determined whether a regional boundary remained static or shifted north-eastwards.

(The writer wishes to thank Mr. W. Smith of the Department of Geography in the University of Liverpool and Professor H. C. Darby of the University of London, for their helpful criticisms).

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THE CYCLE OF THE SEASONS IN THE MIDDLE EAST

WILLIAM C. BRICE*

THE following remarks are designed to show the value, in the teaching of regional geography, of a close knowledge and sympathetic appreciation of the rural calendar. This method of study has been followed in two classic cases, by Kaj Birket-Smith in his book on the Eskimos,[1] and by Jean Brunhes in his description of the life of the Fang tribes of the Cameroons.[2] The first showed how finely adjusted is the timetable of the inhabitants of the American Arctic shores to the circling seasons; how they change their activities according to the length of the day, the thickness of the ice, the depth of the snow, the relative abundance of sea and land game, and the provision of driftwood. Brunhes, in his monograph on habits of life in a far different region, made clear the versatility of the inhabitants of the forests of the Cameroons. At different and fixed seasons they fish the streams, hunt the elephant, clear the jungle and plant the yam, traffic in ivory, or gather wild fruit.

Both these studies have a great value as a warning against the easy generalisation. It is rarely possible to classify folk strictly as hunters, food-gatherers, tillers of the soil. It appears, at least from these two examples, that ways of life are not simply dictated by nature, but evolved by human ingenuity in sympathetic response to her suggestions, which vary with her changing moods from season to season.

But there is another justification for studies of this sort, especially in regions less primitive than the two just mentioned. This is, that they help to make clear the relative importance, for the inhabitants of a region, of the various geographical factors in operation. For instance, a close study of the activities of an Indian village would show that the total annual rainfall is of less importance than its reliability[3]; while in Palestine, the amount of the midwinter rains is of far less concern to the peasant than the promptness of the *statistically* trivial "former rains" of October, which enable him to start his ploughing. A corollary is that this type of study often makes it easier to draw the exact limits of "natural regions," or to determine the geographical allegiance of particular small areas. These suggestions may be illustrated by taking as an example that region of such elusive boundaries, the Middle East.

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* Mr. Brice is lecturer in the Department of Geography of the University of Manchester.

[1] Birket-Smith, K.: *The Eskimos.* (English translation by W. E. Calvert—Methuen, 1936). See especially chap. V.

[2] Brunhes, Jean: *La Geographie Humaine*, vol. I, chap. V, pt. 2, Fribourg, 1910.

[3] Fergusson, F. F.: "Famine and water supply in Western Rajputana"—*Geogr. Journ.*, vol. 93, 1939, p. 39.

In warm temperate latitudes, through the 40° of longitude from Smyrna to Kandahar, the seasonal routine of the peasant farmer varies little. This is not to say that there is everywhere a uniform way of life. According to the reliability of the rainfall, the nearness of mountain pasture, or the proclivities of the inhabitants, varying degrees of the nomadic habit are found widely. Again, every region does not grow every possible crop. In Caria, for example, while the Halicarnassan peninsula has its vineyards and irrigated vegetable gardens, the villages of the Knidian chersonese prefer to produce the fig, olive and valonia acorn; and nearby, the plains about Mylas present a different appearance again, with their extensive fields of sesamum and tobacco—

> *Continuo has leges, aeternaque foedera, certis Imposuit natura locis.* (Georg. I, 60–61).

(And so, Nature has imposed these rules and unchangeable conditions on fixed places).

Yet throughout the Middle East there is a common knowledge and appreciation of a traditional seasonal routine, and a villager of the Mæander valley would not feel himself in strange surroundings if deported to the plains of the Kabul.[4]

The seasonal cycle begins with the first rains, in early October. By late September all the season's crops are in, except for the last of the olive and acorn harvests. The evergreens are wilting and dusty, the ground cracked and parched, and ploughing and sowing cannot begin until the start of the rains. The horizon is eagerly watched for the gathering of the thunder clouds. If the first storm has not broken by the second week of October there is some trepidation. The first rains are an occasion of rejoicing—

> *Sing unto the Lord with thanksgiving . . . who covereth the heaven with clouds, who prepareth the rain for the earth, who maketh grass to grow upon the mountains.* (Psalm 147, 7–8).

As soon as the ground is softened all available beasts are harnessed to the plough. A train journey in winter from Aleppo to Mosul passes many strange plough-teams, sorted from camels, donkeys, oxen and mules. Ploughing and sowing will continue until late in November, while the last of the olives and acorns are gathered. The barley is first committed to the ground, and the wheat soon after.

There follow three less strenuous months—*hiems ignava colono.* (Winter is the farmer's idle season). From December to February is the time for household chores, for repairing field equipment, and for crushing the olives. Late December to mid-February is the season for gathering the orange crop, and the orchards of Mersin have little trouble in attracting cheap labour from as far afield as Antioch in these generally slack months. Meanwhile, the children are kept busy gathering stubble from the fields, to supplement the meagre stocks of fuel; and the husbandman can now undertake the pruning of his vines.

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[4] For a very full survey of the rural calendar in Palestine, see Gustaf Dalman: *Arbeit und Sitte in Palästina*, Band I, Gütersloh, 1928.

In January or February begins the second ploughing, either to break up the fallow or to prepare the ground for the spring sowing, in March, of beans, millet, lucerne, maize, sugar, tobacco. Then follow, from early March until early June, another inactive three months. The rains slacken, the sun gains strength, the grains, well rooted through the winter, now sprout rapidly and begin to ripen. But there is little to do until they are ready for reaping, and this is the season when the archaeologist finds conditions most favourable—the soil fairly dry, the heat not too intense, and the labour supply abundant and ready. It is also the season for ridding the fields of the unwelcome liquorice-root which can be sold to the McAndrew-Forbes agent ; and in April, the month of the opening of the flowers one can collect the saffron crocus for its yellow dye. The garlics and bulbous vegetables are also ready in the spring, and their gathering is an easy task.

In mid-June the archaeologist's labour supply begins to melt away, for the corn is ripening, and the busy season of the year has opened. Harvesting wheat begins in the third week of June, and is followed soon by the barley harvest. Most of the corn is cut by the second week of July ; but the labour of threshing and winnowing is a longer task, and just outside the villages the circular path of the threshing sledge and the piles of winnowed grain can be seen any time from early July until the end of August. Meanwhile the soft fruits—peaches, apricots, cherries—ripen towards the middle of June, and the succulent irrigated vegetables—watermelons, gourds and cucumbers—are ready about a month later ; both these for some weeks provide a refreshing variation in the diet. The tobacco crop is fit for picking by early July, and as its harvest and preparation coincide with those of the grains, the two are rarely grown on the same farm.

In early August the carobs are ripe and can be knocked from the trees for gathering and storage as fodder. The almonds, too, are now ready for picking. In the second week of August the figs become ripe and the vine harvest also is ready. They are gathered in the intervals of cutting the millet and maize, spring-sown grains which ripen about the middle of August.

September is set aside for the olive harvest, only second in importance to that of the wheat and barley. There is now also much to occupy the women-folk, in dealing with the collected figs and grapes. The figs must be strung out for drying, and the congealed grape-juice spread on flat rocks to thicken in the midday sun to a leathery consistency. The resulting *pekmez* provides a supply of sweetening, conveniently storable through the winter. In late summer, also, the ladanum is combed from the hair of the goats, boiled and skimmed of impurities. The year has now travelled full circle, and the October rains are again awaited to open the next season of ploughing and seed-time—

> *redit agricolis labor actus in orbem, Atque in se sua per vestigia volvitur annus.* (Georg. II, 401–2).

(The farmers' toil returns through its orbit, and the year revolves over its own traces).

In this curriculum the most important items are the tree-crops and the winter grains. The tree-crops mature in succession, and although some of the harvests overlap, they never do so in such a way as to impose an excessive strain on the farmer. The almonds and carobs of early August are followed soon by the figs, and then by the vine crop, mature from the middle of the month. The olives are fortunately not ready for gathering until the crisis of the vine harvest is past, and the acorns can safely be left until most of the olives are in. Both the citrus fruits of mid-winter, and the soft fruits of June, are introduced to this region, and fit comfortably into the rotation. While the native tree-crops provide a chief source of animal fodder (carob, acorn), oil (olive), and sweetening (vine), the winter cereals produce the staple of life throughout the Middle East, and the failure of this harvest is always a greater disaster than that of any other.

In this dependence on the tree-crops and the winter grains the area of the Middle East finds its closest comparison in the Mediterranean lands, and the crucial climatic factor which these regions share is the midsummer drought. The winter grains can be grown further afield, in, for instance, the Ganges valley and the Thames basin, and the vine matures on the banks of the Middle Rhine ; but it is the extremely hot, dry midsummer following on a wet winter which makes possible the particular combination of grain and tree-crops which has been described. The rapid and excessive heat of early summer ensures that the grain will mature before the tree-crops are ready, and they in turn find their optimum conditions in a hot midsummer, on a stony, firm and well-drained surface. Even the winter rain is a less important factor than the midsummer drought in maintaining this seasonal routine, for in Central Turkey and Persia, for example, the springs are relied on as much as the rain clouds for a water supply.

In fact, the particular seasonal cycle just described breaks down wherever there is any summer rain, and the boundaries of the geographical area of the Middle East, with its distinctive way of life, may be fixed accurately by drawing the limits of summer rain (Fig. 1). The deserts of the Middle East are deserts of *winter* rainfall, enjoying a degenerate type of Mediterranean climate ; while the Sahara, Sind and Trans-Caspia are deserts of *summer* rainfall, at the rain-starved limits of, respectively, the Sudan, monsoon and central continental climatic regimes. Strictly speaking, south-western Arabia is closer to the Sahara than to the Middle East, and its summer rain does in fact encourage a seasonal routine rather different from that described ; the olive and wheat of Oman are replaced by the coffee and dhurra (millet) of Yemen. The map of average rainfall hides the crucial fact that while Baluchistan and Afghanistan are summer deserts, Sind and South Punjab are winter deserts, with their meagre rainfall late in the hot season. The Sulaiman-Kirthar ranges are the eastern limits of the Middle East, and separate two different worlds. They also, significantly, marked the eastern extreme of Alexandrine and

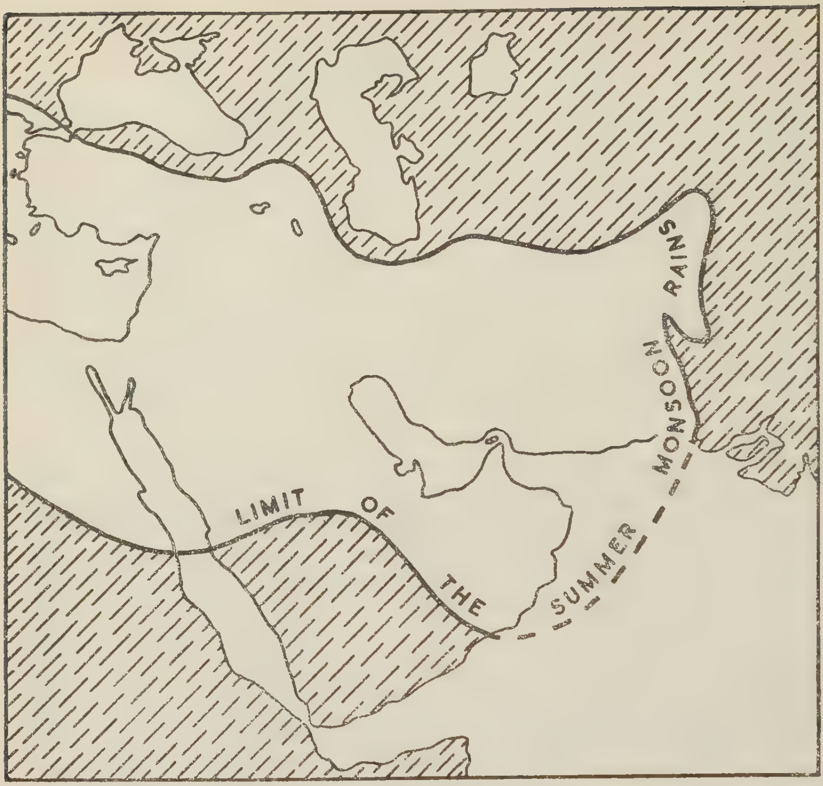

Fig. 1.

Seleucid colonization. To the north, the Elburz-Hindu Kush separate the summer-rainfall desert of Turania from the winter-rainfall desert of Khorasan, and while the first produces cotton, the second boasts its asafœtida and tragacanth. The northern slopes of Elburz, Caucasus and the Pontic ranges are, strictly, outside the Middle East as described, and the tendency of these areas to orient themselves northwards rather than southwards is a well-known fact of political geography.

Reflection on the nature and geographical distribution of the myths of the Vegetation God, who expires annually, only to be resurrected in the fullness of the season,[5] will show first, the continuity of tradition between the Mediterranean shores and the Middle East, and second, the preoccupation of all this region with the midsummer drought.

In developing this approach to regional geography by a study of the traditional seasonal tasks, a teacher may feel himself handicapped by a lack of sources of information. This difficulty may, however, be overcome by perseverence. In the first place, narratives of travel often give valuable information. By their nature these rarely include observations over more than a single season, but such remarks are often both pertinent and picturesque. Brigade-Surgeon Aitchison's description of early spring in the Herat valley of north-western Afghanistan, printed in volume 8 of the Proceedings of the Royal Geographical Society (1886, page 154), is a fine example. The memoirs of Sir W. M. Ramsay[6] and D. G. Hogarth,[7] include many observations on the rural life of Asia Minor, while *The Golden Bough*[8] is a mine of information, as valuable for the geographer as for the anthropologist, on peasant cultures of Europe and Nearer Asia.

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[5] Frazer, Sir James G.: *Adonis, Attis, Osiris.* (*Studies in the history of Oriental Religion*), 1906.

As a second source, traditional literature often gives direct information, as the *Works and Days* or the *Georgics*,[9] or indirect, as the Bible. The first part of *Georgics I* is full of shrewd information about the tasks of early spring: cross-ploughing, harrowing, irrigating, scaring the birds. Here, for example, is an unusual practical hint for this season—

> *Quid* [*dicam*], *qui, ne gravidis procumbat culmus aristis, Luxuriem segetum tenera depascit in herba, Quum primum sulcos aequant sata ?* (Georg. I, 111–113).

(What shall I say of him who, to prevent the stem bending under the weight of the grains, feeds as pasture the thickening corn in its young shoot, as soon as the plants top the ridges ?)

Georgics I, 204–230 give precise information about the times of sowing ; 259–310, full instructions for the tasks of the winter season ; while lines 315–345 of the second book are a gay description of spring, the season for planting out the young vines.

The Bible is a fruitful source of local lore, practice and experience, and just as the story of Jacob gives the finest of pictures of the life of a patriarchal pastoral tribe,[10] so other passages give an insight into the seasonal toils, trials and rejoicings of the Palestinian peasant. Verses 9–13 of Psalm 65 recapture the fresh, open spirit of spring in the Levant, and would be as true for March at Peshawar as at Jerusalem. Psalm 104 is a clear summary of the farmer's world—

> *He causeth the grass to grow for the cattle, and the herb for the service of man : that he may bring forth food out of the earth ;*
> *And wine that maketh glad the heart of man, and oil to make his face to shine, and bread which strengtheneth man's heart. . . .*
> *He appointed the moon for seasons : the sun knoweth his going down.*

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[6] Ramsay, Sir W. M. : *Impressions of Turkey during twelve years' wanderings*, 1897. See especially pp. 269–271.

[7] Hogarth, D. G. : *A wandering scholar in the Levant*, 1896. *Accidents of an antiquary's life*, 1910.

[8] Frazer, Sir J. G. : *The Golden Bough.* (*A Study in Magic and Religion*), in twelve volumes, 3rd edition, 1915.

[9] Hesiod : *Works and Days.* Translated by A. W. Mair in *Hesiod—The Poems and Fragments*, Oxford, 1908. See especially lines 383–617, and Mair's addenda to his translation, pp. 104–147.

Virgil—*The Georgics.* Translated into English verse by James Rhoades, 1891.

[10] See also Sir John Myres : " Ancient Geography in Modern Education "—*Scot. Geogr. Mag.*, vol. xliv, 1928, pp. 269–272.

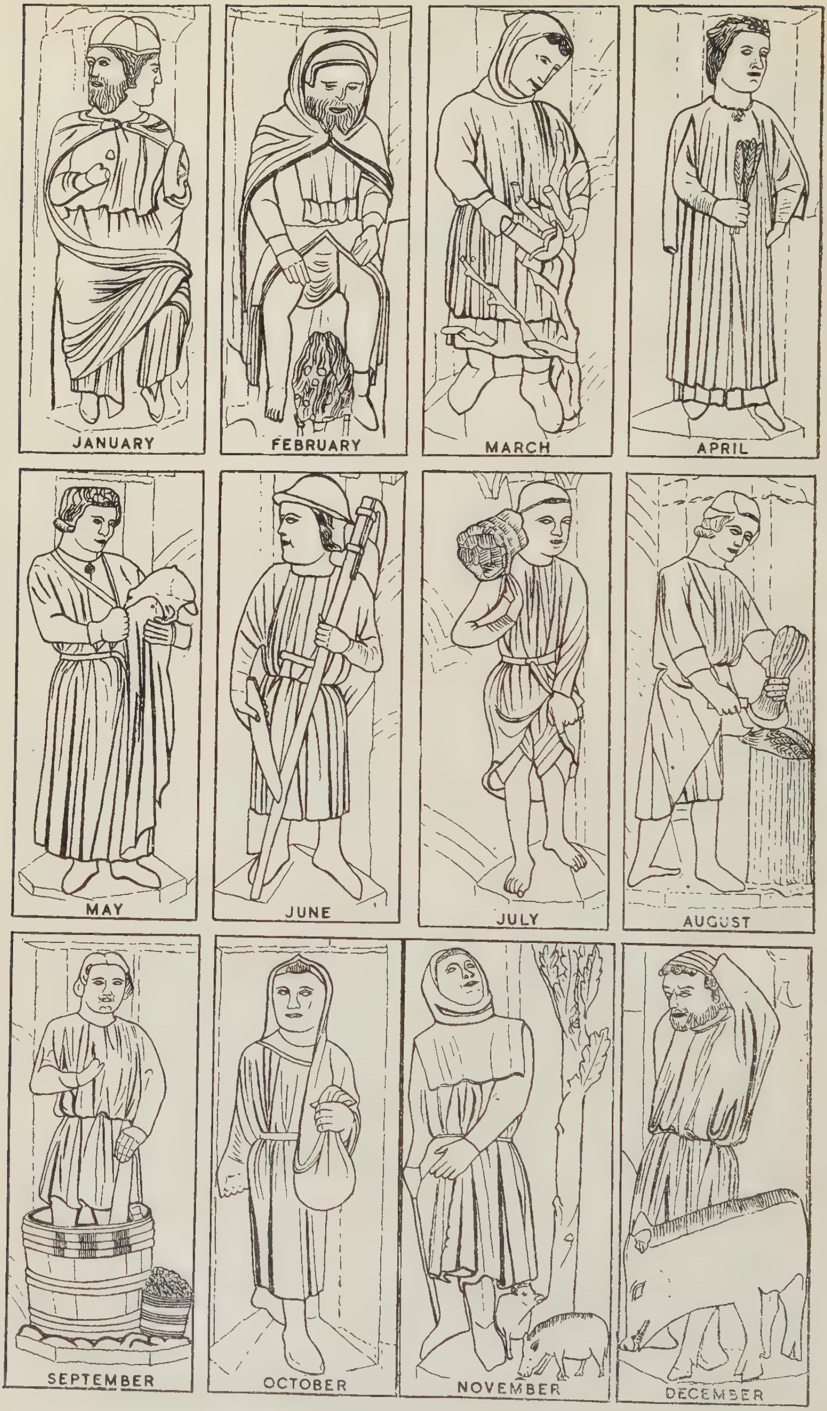
JANUARY
FEBRUARY
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER

FIG. 2.

Verses 33–43 of Psalm 107 are a reminder of the uncertainties of the farmer's life—

> *He turneth rivers into a wilderness, and the watersprings into dry ground. . . .*

The drama of Ruth and Boaz could only take place in the busy outdoor threshing season of July or August. Work is then heavy, every available minute of daylight is valuable, and in the sultry nights it is not unusual to sleep out. In the evening of July 6th, 1947, the writer and his companion arrived at a small Cappadocian village just after nightfall. The place was still deserted, and it was some time before the villagers returned from the threshing-floors, together with the sheep which had been gleaning in the stubble. Next morning, all were out again before us, at daybreak.

To take a New Testament example, the accuracy of the knowledge of local husbandry contained in St. Paul's elaborate metaphor on the grafting of the olive, in Chapter 11 of the *Epistle to the Romans*, have been shown by Sir W. M. Ramsay's scholarly analysis in *Pauline and other Studies* (Chapter IX).

Finally, an unusual but instructive mediaeval illustration of the farmer's seasonal cycle—which might perhaps be matched with some English misereres—is a series of carvings of the months, in a moulding on the north entrance of Chartres Cathedral (Fig. 2).[11] Two-headed January introduces the year : February warms himself over a fire : March prunes his vines : April watches his corn sprouting : May has leisure, before the harvest, for falconry : June sharpens his sickle for the harvest : July wades a stream with his sheaf of corn : August cuts the hay in his meadow : September is busy crushing the vintage : October sows the winter grain : November knocks down acorns for his pigs :[12] December kills his winter pork. It is from such information that a teacher may commence a study of the peasant's seasonal tasks, which change from month to month, just as

> *certis dimensum partibus, orbem*
> *Per duodena regit mundi Solaureus astra.* (Georg. I, 231–2).
> (. . . thro' twelve bright signs Apollo guides
> The year, and earth in sev'ral climes divides. (Dryden)[13]).

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[11] John Ruskin has described a similar series of sculptures in the entrance to St. Mark's, Venice, and compared it with various mediæval manuscript representations. See *The Stones of Venice*, vol. ii, chap. vii, paras. 50–53.

[12] Virgil would condemn the idle farmer to such an existence—

> *Heu ! magnum alterius frustra spectabis acervum,*
> *Concussaque famem in silvis solabere quercu.* (Georg. I, 158–9).

(Alas ! you will look with envy on your neighbour's harvest, and satisfy your hunger by shaking the woodland oak).

Yet acorn flour is still used in Tangiers, and Sir Arnold Wilson, in October, 1908, travelled with Bakhtiaris who anxiously inspected the thickness of the developing acorn crop. (*South-West Persia*, chap. II, p. 65).

[13] John Dryden's verse translation of Virgil preserves much of the melody, as well as the clarity, of the original.

GREATER SYRIA

A STUDY IN POLITICAL GEOGRAPHY

B. H. Dening *

THIS study is devoted to that important area lying between the Persian mountains and the eastern coast of the Mediterranean. The first point to be made about it is that it is a neutral area, in the same way that the centre piece of a roundabout where two major roads meet belongs to neither road nor to both. Anyone who assumes that he can drive straight across a roundabout will run into trouble, and just as surely will any nation trying to assume sovereignty of this neutral area. There is nothing original in picturing this area as a world crossroads for throughout history it has been an important focus. At times vital trade routes ran across it ; at other times it has been the hub of great Empires ; from it culture has spread in all directions ; but to-day its importance in the world picture lies in its strategic location and its economic wealth in the form of oil. It is because of this importance that a closer study of the area itself is merited. It is too easy in dealing with affairs on a world-wide level to forget or ignore the fact that the counters which are used to solve such problems are themselves living organisms, capable, and in this case highly likely, to change their character quickly and with very little warning.

Before proceeding further it is necessary to define more clearly the limits of the area to be considered. Unlike geographical boundaries, political frontiers are very hard and fast. Thus the area which will be referred to as Greater Syria consists of those lands now divided between the Republics of Syria and the Lebanon, and the Kingdoms of Iraq and Jordan. Strictly speaking it also includes the ex-Mandate of Palestine, but the problems of that unfortunate piece of territory are so great that it would be confusing to consider it in the present study. Though references may be made to it and some contexts may appear to include it within Greater Syria, this will only be done in the light of what it was. We therefore have for consideration a territory of 266,650 sq. miles, inhabited by about 9.5 million people. In this area of Greater Syria the biggest problem of internal politics to-day is that revolving round Union or Closer Association of the four States concerned.

PHYSICAL CONSIDERATIONS

A glance at a relief map (Fig. 1) shows that the present frontiers in the north and east follow the edge of the great mountain masses of Turkey and Persia. In the region north and north-east of Aleppo this frontier cuts across a natural movement of people. In Iraq the frontier lies

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*Mr. Dening is an officer of the Sudan Political Department and recently has spent a year as a student of Arabic and Middle East affairs at the Middle East Centre of Arab studies in the Lebanon, and during that time had opportunity of extensive travel in the region of which he writes.

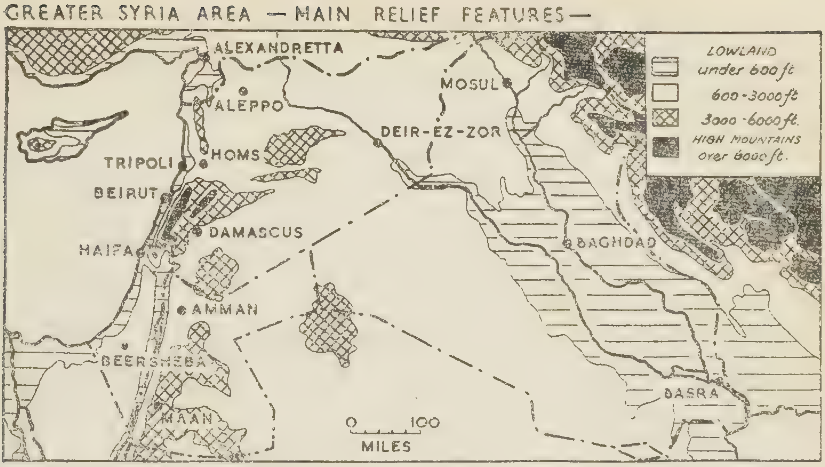
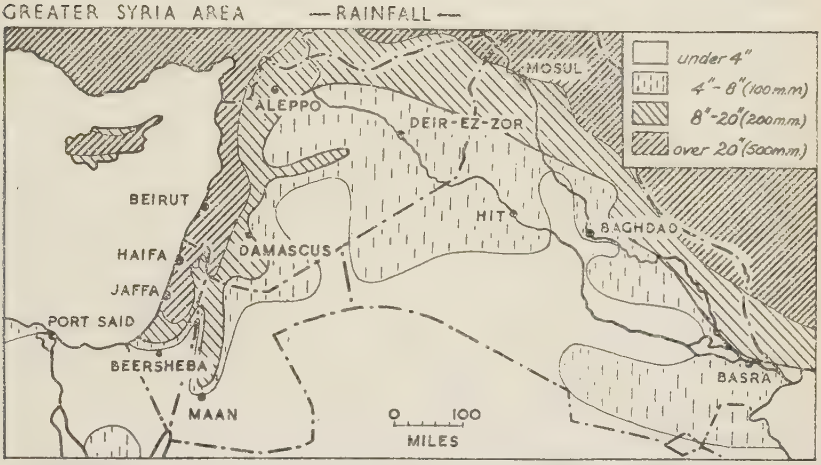


Fig. 1.



FROM WARRINER: LAND & POVERTY IN THE M. EAST — ASHBELL: RAINFALL MAP M. EAST

Fig. 2.

in less densely populated areas, movement across it is less, and it can be regarded as satisfactory. In the south the frontier is quite arbitrary. The great sandy wastes of Arabia reach up into Greater Syria, though their pasturage value increases towards the north. Through such almost uninhabited expanses one line is as good as another. The nomadic tribes will not be confined by any frontier, but will continue to move from pasturage to pasturage as they always have done. In the south-west the deserts of the Negev and Sinai again provide a frontier zone where the shortest line from Aquaba to the Mediterranean will probably be most acceptable. This frontier is really outside the scope of this study and it will be replaced by a new frontier containing the Jewish State, and it will be based on political rather than geographic grounds. So with two notable exceptions, Palestine and the north-west of Syria, Greater Syria is an area with reasonably well-defined natural frontiers. Inside these frontiers, however, there is variety.

In the west a line of hills runs parallel to the coast with only a narrow plain separating them from the sea. In the Lebanon these hills reach a height of over 10,000 ft., and nearly everywhere the crest is over 5,000 ft. North and south of Mt. Lebanon the hills fall considerably in height, so that most of Palestine is below 3,000 ft. None the less, they form an effective barrier and cut off the interior from maritime influences. Only four gaps break through them and these have always been important. They are those connecting Alexandretta with Aleppo, Tripoli with Homs, Beirut with Damascus and Haifa with the Jordan valley.

Proceeding eastward, the next great feature is the desert. This forms a great aching void in the middle of any future united state, a great barrier between Damascus and Baghdad. It is inhabited almost solely by nomadic tribes of beduin. Except where rivers intervene it reaches up to the neighbourhood of the 8 in. rainfall line (Fig. 2), and does in fact cover about half the total area of Greater Syria. Several tracks cross it, and a metalled road runs from Haifa to Baghdad (Fig 3), but without doubt it has always been, and remains, a barrier.

So we are left with the land of the Twin Rivers, or the Fertile Crescent, or to be more exact, that immense curve of potentially rich agricultural land running from Basra to Aleppo and then south to the desert in the latitude of Maan. If the desert separates Baghdad from Damascus the Fertile Crescent unites it with Aleppo. It is worth noting here that these two cities are the largest in our area, each with a population of about 300,000.

With these outstanding physical facts before us, let us consider the various ways this area could be politically divided. It becomes apparent immediately that the present frontiers are quite illogical from the physical geographer's viewpoint. To him there are four basic units or four geographical regions. Without attempting to fix limits to them and acknowledging flaws in them, they are : (1) The Levantine Mountains ; (2) The area of the Twin Rivers ; (3) The cultivatable belt Aleppo—Maan ; (4) The desert. With these as his foundation he might suggest several alternative political divisions. One would comprise three states, corresponding to 1, 2, and 3 above and dividing the desert between 2 and 3, or attaching it to Saudi Arabia. A second alternative would create two states by uniting 1 and 3 leaving 2, and disposing of the desert as before. Then, of course, there is the most important possiblility of a single united state.

However, the physical geographer alone cannot design a practical political unit. Many factors influence the complex organ of a modern state. It is the combined effect of geographical, social, political, economic and strategic considerations that will determine the shape,

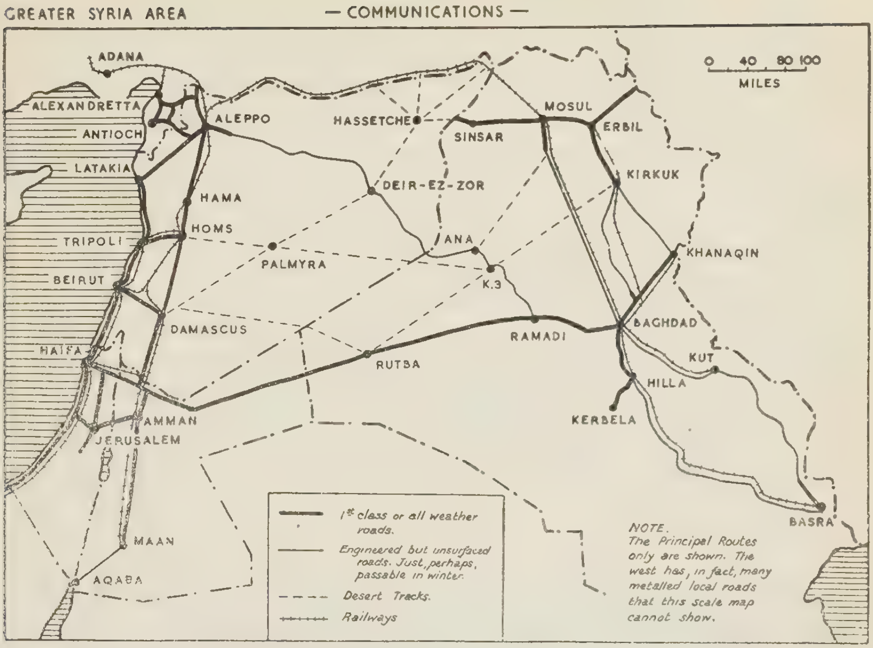


Fig. 3.

form and size of a state. But it is justifiable to claim that the basic influences are geographical, and the others are imposed on the background of hills, rivers and plains. Let us therefore have these three alternatives in mind. As we examine other conditions and factors we must be ready, of course, to consider new divisions if those influences demand them, but let us remember always the western hills, the cultivatable belt and the great wide desert.

THE PEOPLE

The territory of Greater Syria is inhabited by a great variety of people. For centuries various races and religions have been entering the area and most of them have managed to leave a trace of themselves. So mixed and complex are the racial origins of the people that frequently other factors have become more important. In the accompanying table the principle divisions have been listed. Whilst the Kurds are given a column on racial and linguistic grounds, the Shiaites do so on purely religious grounds. There is no common denominator for classifying the population, for neither religion, nor race, nor language would alone present a true picture.

The most numerous group are the Sunnis who form 45 per cent. of the total population and are fairly evenly distributed over the whole area. They are about twice as numerous as the next largest unit, the

Shiaites. They are a powerful unifying force in the midst of so much variety and their political influence is probably even greater than their numbers indicate. For instance, in Iraq where they are outnumbered by the Shiaites, the Government is predominantly Sunni.

In contrast to the Sunnis, the remaining groups are very unevenly distributed, usually being confined to one or two small areas. Such, for instance, are the Kurds, all of whom are found in the north-east of the area. So also about 80 per cent. of the Shiaites are found in Iraq between Baghdad and Basra. Druzes and Alawites occupy very confined areas and their numbers are small. Jews too are unevenly spread, being found mainly in the towns, especially Baghdad. With the exception of the Lebanon, Christians are reasonably evenly distributed but their numbers are small. None of these numerous minorities have any form of co-operation and indeed many fight among themselves. The Christians are divided between about ten different creeds, each seeking to score off the others. The growth of this bickering cannot be entered into here, but it is of great importance to realise its existence in attempting to understand the composition of the population.

Despite the variety of the population, there is in fact much to unite it. The prime unifying factor is language. Nearly 85 per cent. of the people speak Arabic as their mother tongue. Then there is religion. Over 80 per cent. of the people are Moslems and 55 per cent. are Sunni Moslems. This is of immense importance in considering any form of union for it means that basically the people think alike. This is their Arab heritage that has outlived five centuries of Turkish occupation. Many of the roots of present-day differences and difficulties in the area are certainly due to differences in creed, but with the aid of a common language, let alone one predominant religion as well, other countries have become united states, and minorities have been able to practise their creeds in peace and security.

The Population Distribution

The populated area follows the shape of a great semi-circle of varying width. Starting on the Shatt-el-Arab it follows up the line of the two great rivers, Tigris and Euphrates. Until these rivers leave the desert area the people are confined to a narrow belt on each side within irrigation limits. In the north the belt gradually widens as the rainfall increases, and at Aleppo it swings south to run down between the edge of the desert and the sea, until the desert cuts it off south of Maan and Beersheba. The desert itself is very sparsely inhabited by nomadic tribes.

Though the average population density is 33/sq.m. the density of cultivatable land is about 90/sq.m. This cannot be called high, even for an agricultural country, and in fact the area as a whole is underpopulated. Parts of the Lebanon are decidedly overpopulated, but otherwise the general remark holds good.

The population is largely rural with few big towns. Aleppo, Baghdad and Beirut form three large urban centres, with Damascus smaller in size if not in influence. Otherwise there are only about 15 towns with over 15,000 inhabitants. Then there are a large number of villages usually with between 3,000 and 6,000 inhabitants, but occasionally some have overgrown, to reach higher figures.

If we compare the population distribution map with the relief map, we notice at once again how the desert divides the area, and how only the narrow belt of the Euphrates joins east and west together. We see too that even that link gets very weak between Deir-ez-Zor and Aleppo. Although in days past, the Euphrates route between Baghdad and Aleppo was much-used either for trade or purposes of administration, to-day there is little movement on it. We do find in fact, a fairly good natural boundary or frontier zone dividing East from West, for the best frontier is that which people have no natural desire to cross. This is the most important fact that must be remembered from examining the population distribution of Greater Syria.

Occupations and Way of Life

The large majority of the population is rural and is mainly engaged in settled agriculture. There are still large numbers of nomads who move to recognised pastures according to the time of year. These tribes principally occupy the desert zones and rely on their animals for economic existence. Force of circumstances is slowly compelling more and more of them to become semi-agriculturists in that they grow a certain amount of corn each year. However, only the true Beduin can make any use of the desert where agriculture is, and will remain, impossible. The trouble is to keep them in the desert, for they prefer to use the wetter lands where cultivation is possible, because the pasturage is richer.

To understand the settled agriculture of the area it is necessary to appreciate the climatic conditions. The whole area enjoys a climatic regime of winter rains and summer drought. The amount of rain varies from over 80 in. in the Lebanese mountains to almost nothing in the desert. Everywhere the rainfall is very variable from year to year, and as is usual reliability decreases with the annual average. This factor is all-important in agriculture. It controls the crops that can be grown, and when, and influences the yield considerably. It is a problem common to all corners of Greater Syria. The only way to thwart nature here is to use her winter rains for summer irrigation. Two great river systems flow through the area. The Tigris is almost entirely confined to Iraq but the Euphrates flows for much of its course through Syria. In both cases great quantities of flood-water race down them year after year. There is tremendous scope for expanding the present irrigated area.

Apart from possible development of agriculture through irrigation, much of the area with over 8 ins. of rain is capable of greater production.

Throughout the area farming practices and systems of land tenure result in unnecessarily low yields which keeps the population density down.

In the Gezira area of Syria a new agricultural colonisation is taking place, and most of the agricultural machinery found in Syria is concentrated in that area. The area is still very sparsely populated, but it is fertile and with the building of roads is capable of considerable development. The possible increase of population here, and an increase of the irrigation facilities above Deir-ez-Zor, may be sufficient to change the frontier zone already mentioned. Development on the Iraq side of the Gezira would still further help towards unity in this part.

Everywhere, the peasants live in compact villages, fairly regularly spaced over the cultivated area. For reasons of security, supply of water and love of company, the isolated farms of Europe are quite absent. This has led to a great building up of village life. It has become a social system. The Mukhtar, or village headman, with his council of village notables runs the village, allots the land to every male member, settles minor local disputes and is in all ways the village leader and local government representative. This social system is common to all the present territories of Iraq, Lebanon, Syria and Jordan, and is a sensible method of administration.

Turning to the towns we again find similar conditions all through the area. With the exception of Beirut, much of the so-called urban population is actually employed in agriculture and merely lives in the town. The towns are principally market centres for their surrounding districts. Some are religious centres as well, and such have grown in importance and attracted more trade. Industrial towns in the western sense just do not exist, and their subsequent social problems have not yet appeared. However, small industries are steadily becoming established in the bigger cities and with the growth of the oil industry industrial social problems will make themselves felt before long. Up till now town and country have dovetailed into one another satisfactorily. The greater problem to-day is between nomad and settled agriculturist, and this battle is being fought right round the rim of the desert. It is another common problem for all the present separated governments.

It would appear, therefore, that the people of Greater Syria have a common social system, through a common way of life. Differences there are between nomad and agriculturist, agriculturist and townsman, but each is much the same all over the area. Only in the Levantine states perhaps do we find a difference. Here merchants and traders are very active, and in comparison lessen the importance of agriculture.

Economy

The economic basis of Syria, Iraq, Jordan and the Lebanon is agriculture for there is no other form of wealth except oil, which occupies a peculiar position. Roughly 40 per cent. of the total land area is considered cultivatable, whilst at present only 13 per cent. of that 40 per cent. is being cultivated. In ancient times the area was undoubtedly an important grain producing area. Cereals are still the most important crop though yields vary considerably from year to year, are normally low, and there is by no means always a surplus for export. Iraq is the principal producer and usually has a surplus. Syria is next most important, but on the average her imports balance her exports in grain. Jordan used annually to export a small amount of cereals, principally to Palestine. Lebanon invariably needs to import cereals. With proper development a united Greater Syria should be able to supply fully all its own cereal needs and have some for export.

Apart from cereals certain local conditions make dates important in Iraq, olives and grapes in Syria and the Lebanon. Cotton is grown in Iraq and has possibilities in Syria. This country meets a large part of the world's demand for apricots. Both tropical and temperate fruits and vegetables are important in the west of the area. The Lebanon, with its sub-tropical coastal plain and high mountains has a great range of climatic conditions that are not wasted, whilst Syria, too, is able to grow a great variety of fruits.

With such an assortment of products the area should be able to build up a sound agricultural economy mixing subsistence with cash crops, and in the latter case not having to rely on one particular crop.

Industry except for the mining of oil is very meagre. The area lacks mineral wealth for the development of heavy industries, and cannot hope to compete in world markets with old established industrial countries. Industrialisation is a very controversial subject in this part of the world and it is not intended to delve into it here. There does seem to be some case for supporting small local light industries, particularly in the building and foodstuff lines. In Iraq prospects for a cotton industry are good and new ginneries are being built in the Baghdad area. Cotton grows well in both Syria and Iraq, and provided only locally grown cotton is used it might be economic to develop the industry. Other industries may be developed with success using local agricultural raw materials, for power can be produced cheaply from oil. It must be remembered though that material self-sufficiency is not always best economically. If goods can be produced cheaper elsewhere it is usually wisest to import them. Greater Syria does possess one industrial advantage in her supply of cheap labour. However, it is considered that industry will remain limited and never do more than meet local needs. The main contribution that Greater Syria can make to the world is in the form of agricultural raw materials whether in the shape of grain, meat, hides, or vegetable products.

Finally there is oil. This occupies a peculiar position because its development rights are in foreign hands. Oil is both a source of wealth and a curse to Middle East countries. It supplies Iraq with a steady and increasingly large source of revenue, yet that country feels pained that it gets so small a share of the profits. The importance of the oilfields to the Western powers is so great that they cannot afford to lose control of them. Thus one of the biggest problems of external political geography is brought about. It also affects the internal problems of the area since this oil has to be got out of the country. The best way to do this is by pipelines to the Mediterranean coast, and these pipelines cross all the present different states. To all of them, therefore, this oil is a source of wealth in the form of royalties, and, no less important, in the form of wages to locally employed personnel and as money spent both by the company and its imported staff. Mutual understanding all round is a necessity for the common good. As long as separate states hold different parts of the system and each can act as it wishes, all or some of the participants are liable to suffer. The closing of the Haifa pipeline is an example of this. None of the members can afford to lose for long, and if the company should be forced to close down, it is liable to lead to drastic political action affecting everybody interested in keeping the oil flowing.

TRADE

From the economy of the countries concerned it is easy to see that agricultural produce is exported whilst manufactured goods are imported. With the exception of textiles in Iraq, this trade is almost entirely with the west, principally the U.K. and the U.S.A. India supplies a high per cent. of Iraq's textile needs and takes her wheat surplus when there is any. In the case of Iraq, the U.K. is the principal supplier as well as customer because of dollar difficulties. In all these countries there is an adverse balance of trade. In the Lebanon and to a less extent in Syria, invisible exports bridge the gap. The main source of these are migrant traders who send remittances back to their families, whilst tourism and other services also help. Iraq's invisible income is not so large and her financial position is becoming critical.

To handle this trade there are two main ports, Basra and Beirut, both capable of handling large seagoing vessels. The voyage to Basra involves considerable extra mileage in the case of goods to and from Europe and America, yet there is very little transit trade from Beirut to Iraq. The possibilities of developing this overland route are discussed now and again, but it involves heavy expenditure. For this reason there seems to be little prospect of any steps being taken until there is at least an economic union between the several states.

The amount of trade between the states is not great since they all produce primarily the same goods. Though the Lebanon and sometimes Syria need to import wheat, it is bought from outside the area. Very recently grain rotted in Syrian merchants' storehouses because the Lebanon found it cheaper and easier to import wheat from Australia. Although Lebanon can export a certain amount in the way of luxury foodstuffs, the mountainous nature of her countryside and her comparatively dense population means she is and will remain an importer of food. She should be able to supply her deficiency from nearby.

There is, in fact, little in the way of economic interdependence. Iraq has little need of the rest of Greater Syria in order to develop as an agricultural state. She has her own first-class port and trade connections with India that could well be increased. Similarly, Syria and the Lebanon in their economic union will not be hampered by separation from Iraq. Jordan, however, is a land locked and poor state with little prospect of development on her own. Economically she is orientated towards the west via Syria and the Lebanon, and so union with them would be an advantage. The advantages to be gained from overall union are largely passive. The removal of mutual political rivalry might provide greater stability and so encourage economic development to everyone's benefit. It would make possible the planning of the economy of the area as a whole so that each part could be developed along the lines most suited to its conditions, though lack of it need not hamper the prosperity of the individual states, subject to what has been said about Jordan.

Communications

Good government goes with good communications, or without good communications good government is usually absent. The road communications of West Syria and the Lebanon are good, in Jordan adequate, in East Syria and Iraq very decidedly bad. A railway connects Beirut with Baghdad by way of Aleppo and Mosul, but much of the line runs through Turkey and the length of the trip is excessive. From Homs a line runs south to Maan via Damascus and Amman. This was the old Hejaz railway. A largely racked line from Beirut meets this line in the Bekka Valley. In Iraq, Baghdad and Basra are connected by railway, whilst the Baghdad-Kirkuk line is being extended to Erbil. In the west roads are the best means of transport and communication, but in Iraq the railways are very much better than the roads. In Syria the rolling stock is old and administration unimpressive. In Iraq the State Railways are well organised, their rolling stock in good condition and their general working is efficient.

All the communication systems, good or bad tend to be confined to serving their own area so that interzonal connection is bad. This is particularly the case between East and West in Greater Syria. Only one metalled road runs across this way, that from Haifa to Baghdad. In Iraq this road is rapidly breaking up. Several tracks cross the desert, notably the one from Damascus to Rutba used by Nairns' buses, and another along the pipeline from Homs to K3. Lastly there is the track down the Euphrates from Aleppo. None of these really encourage movement between east and West and so cannot be regarded as a unifying factor.

The opening up of the Gezira in North East Syria will call for better communications, whilst a similar development in Iraq will demand the same answer. The gap between the two systems will best be filled by a united state. A good through road between Aleppo and Baghdad would be a great unifying factor, going as it would do through an almost continually inhabited belt. It would also be a real help to opening up the northern territories. This in turn would help to increase the strength of the link between east and west at its weakest point.

Further south a good road direct between Damascus and Baghdad might be justified for administrative and strategic reasons rather than economic ones, but in the course of time its economic value would increase. Without union these non-economic reasons do not exist, and so it is unlikely that it will be built. However, if it is ever built it might encourage a little more intercourse between the two capitals.

It must be remembered in thinking of communications across the Syrian desert, that motor transport can go just about where it pleases over its hard surface. In the north the winter rains make tracks impassable, but further south where there is little rain it is only the trunk roads that need building up as proper roads.

In general, therefore, the present communications do not encourage union between the states of Greater Syria. But with the building of two new trunk roads, especially one down the Euphrates, this disadvantage would be very much reduced. Whilst in the west local communications are good, they need rapid improvement in the east for economic reasons and to unite districts at present isolated from each other.

As for ports, Basra and Beirut with Tripoli and even Latakia, can handle present trade. With economic development a further extension of port facilities will be needed. Whilst Basra is inconveniently placed for trade with the west, Beirut is not ideally situated for serving its hinterland of Greater Syria. The hills behind it make transport inland slow and costly. Tripoli with its easily negotiated gap to Homs is much better placed. It is, however, even further north that a port is required. The natural port of Aleppo is Alexandretta which is now in Turkey. Its return to Syria cannot be considered at the moment, but a port in a foreign country always tends to be unsatisfactory. It is, however, interesting to note that the distances from Baghdad to Beirut and Alexandretta are almost identical, but that the latter route passes through comparatively prosperous country instead of desert. The need for a port will become greater as the northern territories are opened up. Even as economic development inland will call for the growth of such a port and its feeder lines of communication so will these in turn further assist such economic development.

Finally there is air transport. In an area where distances are always going to be large between main centres, air transport is important, and it is adequate to-day for local needs. It cuts down time of travel between Damascus and Baghdad from a month on a camel to four hours by a regular air service. For all its value in the cause of union, its expense still prevents many people from travelling. Until large numbers of people can and do cross the desert frequently that desert must be regarded more as a barrier than just a useless waste.

Conclusion

We have considered the physical, human and economic components of the picture. Throughout we have come across the great barrier the desert. Yet lurking in the background, quietly but persistently, is that narrow link curling round the north of the barrier and joining east with west. It is a link that we have seen is capable of being widened and strengthened, but it must always remain slender compared with the great barrier to its south. Though outsiders may regard Greater Syria as a geographical unit, and indeed it is convenient for them to do so, can it in fact be so regarded ? The answer to the question lies in whether one considers the fertile link stronger than the barren desert. For me to-day geographical influences do not demand union, but if union should come about, there is every promise that the link will become the dominant factor instead of to-day's division by the desert.

In considering this problem of union, one cannot ignore other factors. In Greater Syria circumstances are such that geographical influences, though fundamental to the problem, are not decisive. They do in fact play a passive role, neither precluding nor encouraging union. Essentially they appear to divide the area, yet common problems that they cause in social and economic fields tend to unite it. Distances are large between the main centres of population, but modern means of transport reduce the importance of that considerably. The people possess not only a common language and religion, but also a further common characteristic, that is individuality and it does not allow for co-operation. It is found in the individual's distrust of his neighbour, and shows itself in inter-state relations by the desire of each state to be the one to call the tune and never to be the first to make a concession. So this common characteristic encourages disunity to continue.

This conclusion cannot be completed without a mention of the Lebanon. This small state, especially if the Bekka plain with its predominantly Moslem population is not considered, presents a different cross-section to the rest of Greater Syria. It is a refuge of Christians, its interests lie in trade rather than production, it is culturally much more western than the other countries. Yet for all these differences it depends for its economic prosperity on good trade relations with Syria. Many of its people regard themselves as Arabs belonging to the wider Arab brotherhood of nations. Many, of course, hold the exactly opposite view. Its position in any Greater Syrian state will always be a cause of controversy. Perhaps the solution of its problem lies in a form of local autonomy within the larger state.

GREATER SYRIA (COMPOSITION OF POPULATION)

Country	Sunni Moslems (Arabs)	Shiaites (Arabs)	Kurds + Turcomans	Christians	Jews	Armenians	Druzes	Alawites	Others	Total Population
Iraq	1,300,000	2,000,000	875,000	100,000	100,000	—	—	—	125,000	4,500,000
Syria	2,000,000	13,000	260,000	275,000	30,000	117,000	90,000	325,000	40,000	3,150,500
Lebanon	235,000	209,300	—	520,000	6,000	75,000	74,100	—	6,000	1,126,000
Jordania	460,000	—	—	30,000	—	—	—	—	12,000	502,000
Palestine	1,000,000	41,000	—	125,000	550,000	3,000	9,100	—	12,000	1,740,100
Greater Syria	4,995,000	2,263,300	1,135,000	1,050,000	686,000	195,000	173,200	325,000	195,500	11,018,600
	per cent. 45	per cent. 21·5	per cent. 10	per cent. 10	per cent. 6	per cent. 2	per cent. 1.5	per cent 3	per cent. 2	per cent. 100
Greater Syria—Palestine	3,995,000	2,222,300	1,135,000	925,000	136,000	192,000	164,000	325,000	183,500	9,278,500
	per cent. 44	per cent. 24	per cent. 12	per cent. 10	per cent. 1	per cent. 2	per cent. 2	per cent. 3	per cent. 2	per cent. 100

NOTES.

1. The figure given for Christians includes 328,000 Lebanese and 13,400 Syrian Maronites.
2. In the full Greater Syria 80 per cent. of the population is Moslem and 83 per cent. speaks Arabic.
3. In the smaller Greater Syria 85 per cent. of the population is Moslem and 84 per cent. speaks Arabic.

Information chiefly from Hourani: *Minorities in the Arab World.*

GREATER SYRIA, AGRICULTURAL AREAS.

Country	(1) Total Area	(2) Cult'able Area	(3) (2) as per cent. (1)	(4) Cultivated Area	(5) (4) as per cent (2)	(6) Irrigated Land
Iraq	112,000,000	30,000,000	per cent. 26	6,000,000	per cent. 20	per cent. 75 of (4) 66 of (2)
Syria	46,401,000	25,520,000*	60	3,000,000	100	18 of (4)
Lebanon ..	2,542,500	562,000	25	562,000	12	13 of (4)
Jordania ..	21,600,000	1,638,400†	5	1,122,500†	100†	1 of (4)
Greater Syria	182,543,500	77,720,400	40	10,684,500	13	

NOTES.

1. Areas are all in acres.

2. Figures have been obtained from various sources and cannot be relied on as accurate, though in the case of Iraq they are highly responsible estimates.

3. In fuller detail column (4) is per cent. land cultivatable of the whole country. In fuller detail column (5) is per cent. land cultivated of the land cultivatable.

*4. This figure seems unduly high and must include some pasture land rather than true cultivatable land.

†5. In good years up to an additional 515,900 acres can be brought under cultivation, this has been added in (3), but since all land cultivatable in Jordania is cultivated, i.e., to the extent the rains allow, (5) reads 100 per cent.

6. No figures for (3) being available in the case of the Lebanon, it has been assumed from personal knowledge and observation that the Lebanon is being cultivated to its utmost extent.

OBITUARY.

Hugh Robert Mill

When Hugh Robert Mill's long life came to an end on April 5th, 1950, in his 89th year, geography lost one of its oldest and foremost exponents. He was born at Thurso, Caithness, on May 28th, 1861, the tenth child of Dr. James Mill, a medical man who combined his practice with a successful interest in farming. Mill's early school years were followed by seven years during which he was too ill to have regular schooling, but, educated at home, he became a voracious reader, with a strong bias towards physical science. By 1879 he had decided to go to the University of Edinburgh, where he came under the influence of Crum Brown, P. G. Tait, G. Crystal, James Geikie, and other giants of the day. His enthusiasm for chemistry grew and the accuracy of physical science enchanted him. But other influences also left their lasting marks ; Patrick Geddes, the most inspiring influence in Edinburgh in the early eighties, Sir John Murray and J. Y. Buchanan with all the scientific wealth of the *Challenger*. The sea had always appealed to him and in the *Challenger* office in Granton, he fostered these interests. From 1884 for some years he worked in the Scottish Marine Station at Granton, which was later moved to the Clyde, and became the Millport Marine Station. He worked also on Fishery Board vessels. Mill's genius for friendship gave him lifelong friends in those days, when the name of the *Challenger* brought the world's leading geographers and oceanographers to Scotland. The Scottish lochs, strangely unsurveyed, attracted him also and in those years he began his survey of them and of the English Lakes, in association with Sir John Murray, E. Heawood, H. N. Dickson and others, a work eventually to be published by the Royal Geographical Society. Mill also gave lectures at the Heriot Watt College and at University Extension courses in many towns. These were chiefly on physical geography, and showed a rarely-equalled faculty for lucid exposition. The founding of the Royal Scottish Geographical Society in Edinburgh in 1885 brought Mill, who was an active participant, into contact with many travellers from all over the world and, most important of all, it began a lifelong friendship with that great cartographer, John Bartholomew. In 1892, Mill moved to London on his appointment as librarian of the Royal Geographical Society. In some eight years he left a lasting mark on the Society in the new catalogues for which he arranged. He resigned in 1900, on taking over the private venture known as *The British Rainfall Organisation*. This was to be his life work, and he was responsible for it and its great expansion until 1919, when the Royal Meteorological Society took charge and past records went to the Air Ministry. Mill considered himself primarily a geographer and he sought to find a basis for formulating the principles of geography as a comprehensive science. His *Realm of Nature* brought him near to this ambition, and nearer still, perhaps, his presidential address to the Geographical Association in 1933. But he never lost his interest in oceanography, even in the stress of his British Rainfall work, and from 1901 to 1909 he was British representative on the International Council for the Study of the Sea. " If I were called upon," wrote Mill, " to sum up the main purpose of my scientific work in a single sentence, I should say that it was the study of the part played by water in the economy of the world through the action of solar heat and terrestrial gravitation, raising vapour from the sea and carrying the condensed moisture back over the land . . . " Mill succeeded in writing geography without the need of a new jargon, and he did not share the narrow limitations of those geographers who would, on account of their lack of population, exclude the polar regions and the sea from their studies. Although governed largely by the discipline of the physical sciences, he was not negligent of the importance of the less precise human and social considerations in a complete geographical synthesis. It is a pity that two of his suggestions never materialised. One was a glossary of geographical terminology ; the other, more ambitious, a geographical description of the British Isles, using all existing surveys and statistical records.[1] Mill's writings were too numerous to be listed here, but all his books have lasting value, for to each he brought carefully weighed statements and balanced criticism. Among the best-known are *The Realm of Nature*, which he regarded as his best work, *The International Geography*, of which he was editor, *The Record of The Royal Geographical Society*, a survey of a century of British geography, *The Siege of the South Pole*, of which to his annoyance the publisher would not risk a revised edition with later events, and *The Life of Sir E. Shackleton*, in which he showed a rare understanding of that amazing man. But Mill's most interesting book was produced only for private circulation among his friends. It is *Life interests of a geographer : an experiment in autobiography*, [2] privately issued in 1945, a frank and full confession of his aims and achievements and an analysis of his own work, written throughout with unusual intimacy and candour. But all his writings were clear and vivid. He was never boring and never ambiguous. In his full life, Mill always had time to help others. It is not easy for one who owes much to his help and guidance for nearly half a century not to seem to overrate Mill's influence on modern geography, but there are many others who will gladly acknowledge his generous readiness to help. He was never too busy to read manuscripts and proofs, especially of any polar work, and he never failed to make valuable suggestions. Many works of Antarctic travel are prefaced by words of his for Mill's hobby and latterly almost his chief interest was the study of the Antarctic regions and the friendship of Antarctic explorers. He was never in polar regions, north or south, but so intimate was his study of them that he was recognised as one of the highest authorities on Antarctic geography and history. He sped the departure of nearly every Antarctic ship during his active years. Perhaps this interest had its origin in his task early in his career at the Royal Geographical Society of finding naturalists to serve in the *Balaena* and the *Active* to South Polar regions in 1892. To this interest he put all his habitual care and balanced judgment. He found also a naturalist to serve with the Jackson Harmsworth Expedition to Franz Josef Land in 1896, and one to serve in the *Blancathra* to the Barents Sea in 1898, in place of himself who had been invited by Major A. Coats to accompany him. On all these occasions he showed his sound understanding in choosing W. S. Bruce. Mill's library of Antarctic works includes every book on Antarctic exploration in all languages, and is certainly the most complete Antarctic library in existence. Two years ago he presented this priceless collection of some 500 volumes to the Scott Polar Research Institute at Cambridge. Several Antarctic features have been named for Mill, including Mill Glacier, tributary of the Beardmore Glacier Mill Rise in the Southern Ocean, in about Lat. 47° S., Long. 148° E. ; Mill Peak in MacRobertson Land, and Mill Cove in the South Orkneys. Well do I recall our decision to pay tribute to Mill's oceanographical interests, as we laboriously sounded the ice-covered bay, drilling holes for wire-sounding in ice of from 12 to 20 inches thick, and at the end of the day the three of us returning to our tent and penguin steaks. An honour which Mill highly appreciated was his election as the sole honorary member of the exclusive Antarctic Club. For many years, until he was well over seventy, he attended its annual dinner. When his failing eyesight made London after dark too dangerous an adventure, I went to his club to fetch him. But at length he had to give in and miss his annual gathering, where he readily distinguished most members by voice and not by eye, and was rarely at fault in recalling details of any particular ship or expedition. Likewise did the Arctic Club make an exception in electing him an honorary member. Mill's work brought him a number of honours in addition to the recognition by his fellow geographers of his leadership in many aspects of thought. In 1900, he was made an honorary LL.D. of St. Andrews ; in 1901 he was President of Section E of the British Association ; he was a Victoria Medallist of the Royal Geographical Society in 1915 ; a medallist of the Royal Scottish Geographical Society, and a Commander of the Norwegian Order of St. Olav. In 1907 he was elected President of the Royal Meteorological Society, and from 1927 to 1932 he was Vice-President of the Royal Geographical Society, the Presidency of which Society he declined in 1933. He was a member of most other Geographical and allied societies in Europe and America.

R. N. Rudmose Brown.

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[1] H. R. Mill. " Proposed Geographical Description of the British Isles Based on the Ordnance Survey." *Geogr. Journ.*, Vol. vii, 1896, pp. 345-365. " A Fragment of England : South West Sussex." *Geogr. Journ.*, Vol. xv, 1900, pp. 205-227 and 353-378.

[2] See the account by T. C. Warrington in *Geography*, Vol. xxxii, 1947, pp. 166-168. A copy has been presented by the Library of the Association and may be consulted there.—*Ed.*

Hugh Robert Mill was the son of a medical man of Thurso, Caithness, and was born in 1861 and educated at Edinburgh University. Scotland in the late 19th century was producing a number of distinguished thinkers and workers on geographical lines concerned to bring together diverse lines of analytical scientific research into a synthesis of man's relations with environment. Bartholomew's maps, Bruce's explorations, George Adam Smith's transcendent interpretations, Mill's almost poetic exposition of nature at work, Herbertson's painstaking analyses and Patrick Geddes' flashes of suggestive thought interwove themselves and made great contributions to the common pool of thought. Mill felt especially concerned to study and expound the influence of the physical features of the earth on human phenomena studied from the point of view of their distribution.

Though Mill was not present at the meeting in Christchurch College, Oxford, at which Dickinson and Mackinder founded our Geographical Association in 1893, he soon became a member of its Council and an active guide and friend, indeed one of its chief helpers in its youthful struggles. In those days he was librarian of the Royal Geographical Society and already concerned in organizing and advising concerning Antarctic research, from participation in which he was barred by defective sight. After the turn of the century Mill took up the rainfall studies which we all associate with his name. Still concerned with the influence of relief, he was now concentrating on the ways in which it determined the features of the earth's fluid envelope, the hydrosphere. During the same years he also found time to edit the well-known old standard *International Geography* (1899), to which some of us look back even now. His work on rainfall led him into questions of water supply and water power, in both of which fields he became a valuable counsellor of public authorities. After his retirement from these duties he was able once more to become an active helper and an inspiration to our Association, over which he presided in 1932-33. His eloquent addresses with their unbroken flow of splendid phrases delivered without notes of any kind gave him an oratorical standing alongside that of his fellow geographers, Halford Mackinder and George Adam Smith. In his case it was an expression of an inner vision of the splendour of nature, of which his eyes gave him but an imperfect picture. One of these addresses to us, on Scotland, was afterwards dictated by him in almost the same words and was given to us for publication in *Geography*.

Mill continued throughout his life his interest in Antarctic research and promoted and helped the explorations of all those who adventured for scientific purposes into the continent of ice. His warm admiration for Sir Ernest Shackleton is well known and was expressed in his life of that great explorer published in 1923. He appropriately became Chairman of the Board of Directors of the Scott Polar Research Institute at Cambridge to which his unique library of works on polar research is presented.

H. J. Fleure.

CORRESPONDENCE

The Honorary Secretary has received the following letter from Mr. Fairgrieve and has much pleasure in publishing it.

Dear Madam,

Will you kindly convey to the united members of the Geographical Association my sincere thanks for the greetings and congratulations I received from them on the occasion of my 80th birthday. I am greatly gratified by this expression of their kindly thought.

I am,
Yours faithfully,
J. Fairgrieve.

London, N. 11.
March 18th, 1950.

A DICTIONARY OF GEOGRAPHY

May I refer briefly to the review of my *Dictionary of Geography* (Penguin) that appeared in the March number. I should first like to congratulate the reviewer on his powers of dissection ; the evident pleasure he derived from the operation almost reconciled me to the aggressiveness with which it was performed. But may I suggest that before assuming the role of pontifex maximus, he should have ascertained the facts. It is pardonable, perhaps, that he should be ignorant of such terms as Cotton Belt Climate, used by American geographers, graphically, and, in my belief, legitimately. Among other climatic regions " defined in terms of things other than their climatic characteristics," is the term Mediterranean Climate also tabu. As for the terms that " would normally be sought in any standard dictionary," I suppose one would exclude the term Atom from a Dictionary of Science for the same reason.

A well-tried if feeble method of criticism is to extract fragmentary quotations out of context and exhibit them ; I could hardly expect that your reviewer would deny himself the exhilaration of this practice. But what I find more difficult to understand is his description of the photographs as " magnificent but rather irrelevant." How pictures which illustrate the items in the text can be " rather irrelevant " escapes my comprehension. A more unworthy feature of the review was the gibe about the Meteorological Glossary. I did in fact communicate with the Meteorological Office on certain points, and with their usual courtesy they co-operated. To mention an instance : some terms, as officially defined in this country, are not internationally recognised, and I added this fact. Hence the " embroidery." Surely it is obvious that terms like Absolute Drought, Partial Drought, Dry Spell, Wet Spell cannot be defined in other words than those I have adopted.

Now to proceed to a more fundamental issue : it was gallant of your reviewer to interpret the purpose of my book for me, and to imply that I was attempting to incorporate into it text-books on meteorology, geology, anthropology, and other subjects he so painstakingly listed, thereby giving myself the task of defining such " key terms " as convergence and divergence, sial and sima, etc. My aim, however, was simply to describe or define those phenomena and topics which are normally held to come within the scope of physical geography. I have yet to discover the terms convergence, divergence, etc. in any book of physical geography ; but perhaps the reviewer can enlighten me. All this must be plain to anyone who has read the foreword to my book, and it does appear regrettable that I have to state the obvious in order to defend myself against criticisms based on false assumptions.

W. G. MOORE.

Our reviewer writes " It is the function of dictionaries to inform and not to misinform : they must therefore speak with authority or not at all. It is the function of reviews to guide readers, and never do they need guidance more than when they are offered a work as attractive, plausible, and apparently filling a long-felt want, as this one. This dictionary lacks authority and must therefore be rejected, whatever were the aims in Mr. Moore's mind. The exhibition of " fragmentary quotations out of context " of which he complains reveals clearly—much more clearly, it would seem, to others than to Mr. Moore himself—how frequently, how egregiously, and over how wide a field, he is in error. He asks to be enlightened regarding convergence and divergence : let him but consult Sverdrup's standard work on *The Oceans*, or Kendrew's *Climatology* (Oxford, 1949) or even his copy of the *Meteorological Glossary* and he will find what he seeks and what the readers of his dictionary must seek in vain. For the rest we can but invite Mr. Moore (and the readers of *Geography*) to read again the original review with its other " fragmentary quotations " and to agree that these are evidences of unreliability of an order not to be accepted in anything styling itself a work of reference."

◆

Members are asked to note that owing to staff changes at headquarters it will not be possible to see the September issue of *Geography* through the press in August. Publication is consequently liable to be delayed until October.

GEOGRAPHICAL ASSOCIATION

REMOVAL OF HEADQUARTERS: APRIL 25th–28th, 1950.

The headquarters and library of the Association are now in Sheffield at the following address: *c/o The Park Branch Library, Duke Street, Sheffield,* 2. The removal of our offices from Manchester after 20 years residence in that city has entailed much work for our staff and we are indebted to them for the help which they have given under somewhat trying conditions. Mrs. Mann remains with us in Sheffield until August. To her a very special word of thanks is due for her many efforts and personal sacrifices made on our behalf through a number of years, and the very sincere good wishes of the Association are extended to her; we accept her resignation with much regret.

The transition has been difficult, and we ask members to accept our apologies if delays have occurred in the receipt of replies to correspondence. We hope to have the library and office working normally again by June. The changed regime has necessitated complete restaffing and some changes in personnel. These will be reported on more fully in the next issue of *Geography*, but meanwhile members should note that any enquiries concerning the purchase of O.S. maps (other than the G.A. map sets) should now be directed to Mr. Horrocks, Central High School for Boys, Whitworth Street, Manchester, and not to Mr. T. C. Warrington, as hitherto.

THE SPRING CONFERENCE, FALMOUTH, 1950

The organisation of a spring conference in Cornwall was something of an experiment, and the great efforts made by the local Cornish branch, not yet of two years' standing, ensured that it would be a real success. The conference was attended, despite the distance, by about 200 members.

At any time, a visit to Cornwall at Easter is a memorable experience for those of us who come from industrial or urbanised England and northern climates, and as the setting for a spring conference, Falmouth proved to be ideal. We owe a great debt to our many friends in Cornwall who worked hard to make the visit a great occasion for all of us, and especially are we indebted to the local secretary, Mr. Ivor Thomas, for his efforts on our behalf.

An exhibition illustrating the local geography of Cornwall was organised and remained open throughout the meetings, and a series of valuable lectures was given by local experts, including addresses on "The Cornish Environment," by Mr. Ivor Thomas; "The Geology of the Lizard Area," by Dr. E. M. L. Hendriks; "Cornish Mines and Miners," by Mr. A. K. Hamilton-Jenkins; and "Some Aspects of the Archæology of West Penwith," by Miss D. Dudley. It was a keen disappointment that illness prevented Professor Wooldridge from lecturing to us on "The Physiography of Cornwall," and members will be glad to know that he has made a good recovery from his indisposition. We were privileged, indeed, to hear the delightful address by Sir Cyril Fox on "Celtic Mirrors and Trade in South-West Britain, from 50 B.C. to A.D. 50" and, later, a brilliant lecture by Professor Bowen on "The Travels of the Celtic Saints and Settlement in Cornwall."

A series of excursions, ranging from Tintagel to the Lizard and Land's End to the Tamar, gave us a balanced view of all aspects of Cornish geography with its rich diversity of coastal and rural scenery and morphology; its fascinating historical and prehistorical geography; no less than its peculiar and varied economic geography associated with specialised features of agriculture, fisheries, mining, quarrying and kaolin clay works. The excursions concluded, appropriately, for those able to stay until Saturday, with a memorable visit for some to St. Michael's Mount, dangerously near the rising tide limit, and for others, with an excursion by boat, all but "shipwrecked" in the Fal inlet! These adventures will long be remembered, no less than the spectacle of storm waves lashing the cliffs at Land's End and the Lizard, or the riot of colour in fields of anemones in full bloom, and of tree blossom bathed in warm sunshine, at a time when, elsewhere, England was experiencing one of the coldest and most dismal records of wintry Easter weather.

To the Viscount Clifden, President of the Cornish Branch, and to the Mayor of Falmouth we extend sincere thanks for their interest and generous hospitality during our visit. We are indeed grateful also to Sir Harry Lindsay for his kindness in sparing time to join us in Cornwall to preside at some of our meetings and Council. To our Cornish friends who worked so strenuously on our behalf both before and during the Conference, we may in thanking them warmly repeat two questions often heard during our stay: "Can the duration of our Spring Conferences be lengthened to a week or more?" and "When can we come here again?"

THE NATIONAL COMMITTEE FOR GEOGRAPHY

On February 6th, 1950, the British National Committee for Geography held its first meeting since the International Congress recently held at Lisbon. The terms of reference of British National Committees set up by the Royal Society are in general "the promotion of the branches of sciences with which they are concerned, more especially as regards international requirements, the nomination of delegates to represent the United Kingdom at meetings of the Unions, and the initiation of proposals or questions for discussion at such meetings." As regards the International Geographical Union, the functions of the National Committees "shall be to promote and co-ordinate in their respective countries the study of the various branches of Geography, with special reference to their international aspects." Each national committee, either singly or jointly with one or more other national committees, has the right to submit to the Union for discussion questions within the competence of the Union.

The membership of the British National Committee for Geography is as follows:—*Chairman:* Brigadier R. A. Bagnold. *Ex-officio:* Hydrographer of the Navy; Director-General of the Ordnance Survey; Director of Military Surveys; President, Section E, British Association; President of the Royal Geographical Society; President of the Royal Scottish Geographical Society; President of the Manchester Geographical Society; President of the Geographical Association; Professor L. Dudley Stamp (Vice-President of the Union). *Royal Society:* Brigadier R. A. Bagnold, Sir Edward Salisbury. *Royal Society of Edinburgh:* Mr. J. Bartholomew. *Royal Geographical Society:* Professor C. B. Fawcett (Mr. Leonard Brooks, acting), Professor J. A. Steers, Mr. J. M. Wordie. *Ministry of Town and Country Planning:* Dr. E. C. Willatts. *Geographical Association:* Dr. A. Garnett. *Ministry of Civil Aviation:* Mr. W. E. B. Griffiths. *Royal Scottish Geographical Society:* Professor A. G. Ogilvie. *Institute of British Geographers:* Professor R. O. Buchanan. *Air Ministry:* Air Commodore Merer, Group Captain P. H. Cater. *Directorate of Colonial Surveys:* Brigadier M. Hotine. *Additional Members:* Professor H. J. Fleure, Professor E. G. R. Taylor. At its recent meeting the Committee recommended that Mr. L. P. Kirwan be made an additional member of the National Committee for the current period.

The Committee has decided to appoint a Sub-Committee consisting of Brigadier R. A. Bagnold (Chairman), Professor Dudley Stamp (Vice-President of the International Union), Mr. L. P. Kirwan, Professor E. G. R. Taylor, and Mr. J. M. Wordie, to act on the behalf of the National Committee for Geography on the day to day international relations with the Union and keep the National Committee informed of all its activities.

One of the first duties which falls to the Sub-Committee is to arrange the machinery for contributing items to the News Letter which is being issued by the International Geographical Union, and to arrange for the distribution of the News Letter in this country. The first number of the News Letter has been published and the allocation to this country is likely to be in the neighbourhood of 250 copies. It is hoped to issue the News Letter twice a year.

The Executive Committee of the International Union of Geography is to meet in London from August 28th–30th, 1950, and it is hoped to arrange a joint meeting with the British National Committee at the Royal Society.

The National Committee received a report on the activities of the International Geographical Union during 1949 and also the estimated budget for the next three years. The funds of the Union are derived from (1) subscriptions from the member countries and (2) a grant from Unesco. The main items of expense are for travel and editorial expenses.

Other matters which were discussed by the National Committee have been referred to the Sub-Committee and some will be discussed at the joint meeting with the Executive Committee of the Union in August.

The present officers of the International Geographical Union are as follows: *Honorary President:* Professor E. de Martonne. *President:* Professor G. B. Cressey. *First Vice-President:* Professor M. A. Lefevre. *Vice-Presidents:*

Professor R. Almagia ; Professor H. Boesch ; Professor G. Kuriyan ; Professor C. Leite de Castro ; Professor O. Ribeiro ; Professor L. Dudley Stamp. *Secretary-General :* Professor George H. T. Kimble. The Headquarters of the Union are at the Department of Geography, McGill University, Montreal, Canada.

IMPERIAL INSTITUTE

At a recent meeting of the Education Committee of the Imperial Institute a number of points arose which may be of interest to readers of *Geography.*

1. One thousand School Parties annually visit the Imperial Institute, using the free service of guide lecturers and the new and popular Quiz method of instruction.

2. During July, 1950, the Central Film Library, which has hitherto been housed at the Institute, is likely to move to other premises, from which it will continue the free loan to schools of films from the Commonwealth Section of the Library. These films are mainly supplied by the Dominion and Colonial Governments ; they are not " teaching " films but give a valuable " background " picture of life and economic activity in various parts of the Empire. From the same sources the Institute will draw the films it requires for the maintenance of its Commonwealth Film Programmes, every weekday afternoon, in its own cinema.

3. The Institute has a collection of Commonwealth and Empire photographs. The strips, of which over 4,000 were loaned to schools last year, are available also for purchase.

4. The Institute is co-operating with local Education Authorities and with Borough and County Museums which are planning " loan exhibits " for temporary use in schools remote from museum centres. Sir Harry Lindsay, the Director of the Institute, is hoping that the re-opening of the galleries and the cinema on Sundays may be practicable by April, 1951.

THE WOOL EDUCATION SOCIETY

The International Wool Secretariat informs us that a " Wool Education Society " has been formed to disseminate knowledge about wool. It will arrange lectures and film shows and publish a journal. Membership is open to teachers at an annual subscription of 7s. 6d. Enquiries and applications should be addressed to the Director of Education, International Wool Secretariat, Dorland House, 18–20, Regent Street, London, S.W.1.

Educational Productions, Ltd., of 17, Denbigh Street, London, S.W.1, inform us that they have now taken over distribution in this country of film strips produced by the State Education Department, Victoria, Australia. These film strips, on a variety of popular subjects, have previously been available on loan from the Agent-General for Victoria in London but will now be available for purchase through Educational Productions, Ltd.

The strips are issued in two price categories : (*a*) strips of wide popular appeal in this country, available at 10s. per strip (without notes) ; (*b*) strips of a more restricted appeal, available at 5s. per strip (without notes).

Titles include such popular subjects as The Story of Wool, The Food We Eat, Glaciers, Perspective, etc., and a specially re-edited strip for juniors on the Koala. Full details of all the strips are given in a special supplement to their catalogue now available from Educational Productions, Ltd.

A CORRECTION

In response to the request made in the Appendix to Mr. N. V. Scarfe's article on " The Teaching of Geography in Schools : a review of British Research " (*Geography*, vol xxxiv, 1949, pp. 57–65), Mr. C. L. Heywood writes that the date 1940 at the beginning of the entry against his name in paragraph 2(*a*) on page 64 should be 1938. The date 1940 later in the same entry is correct.

YUGOSLAV SCHOOLBOY CORRESPONDENTS

Mr. J. M. Strachan informs us that he has arranged for a number of boys over 15 in his school (the Grammar School, Newport, Essex) to exchange letters with boys of a similar age in Yugoslavia. But more Yugoslav boys (and some girls) send letters than can be answered by his own boys. Any teacher who is interested in finding boys anxious to answer to the letters Mr. Strachan has on his hands, or who would like the addresses of schools in Yugoslavia, should write to him at 34, South Road, Saffron Waldon, Essex.

THE GEOGRAPHICAL ASSOCIATION.

Dr. ACCUMULATED FUND—INCOME AND EXPENDITURE ACCOUNT. Year ended 31st December, 1949. Cr.

1948 £		£	s.	d.	£	s.	d.
	To *Geography* :—						
827	Printing and Publishing ..	787	16	0			
26	Blocks	28	12	0			
80	Postage	87	4	7			
					903	12	7
221	,, Printing and Stationery				148	10	10
30	,, Addressograph				20	5	1
9	,, Insurance				8	10	0
725	,, Salaries and National Insurance..				799	18	0
96	,, Postages General				94	5	7
36	,, Sundry Office Expenses				21	12	11
10	,, Library Expenses				15	9	8
11	,, Telephone				9	10	2
7	,, Bank Charges				8	17	6
127	,, Officers and Standing Committee Expenses ..				118	10	8
20	,, Non-Recurring Grants to Branches				10	0	0
4	,, Donations and Subscriptions				3	7	6
60	,, Accountancy Charges				30	0	0
46	,, Subventions to Branches				44	17	6
121	,, *Balance* being Surplus for the year carried to Accumulated Fund				186	2	0
£2,456					£2,423	10	0

1948 £		£	s.	d.	£	s.	d.
399	By Sales of Publications, etc., and Royalty				296	6	7
—	,, Surplus on Summer School				6	3	6
236	,, Advertisements				317	2	0
27	,, Returned Library Postages				21	17	7
—	,, Closed Branches—Surplus Funds				7	16	6
	,, *Subscriptions* :—						
	Current	£1,598	4	4			
	Arrears	9	6	0			
1,646					1,607	10	4
	,, *Interest on Investments and Building Society Deposits* (including Investments and Deposits held in Life Membership Jubilee and Herbertson Memorial Funds) :—						
96	On Investments (gross)	98	11	8			
21	,, Building Society Deposits ..	24	2	6			
18	Income Tax recovered in respect of 1947 Income	—					
					122	14	2
—	,, Surplus on Annual Conference				43	19	4
13	,, Gifts				—		
£2,456					£2,423	10	0

Dr. MISCELLANEOUS MAP SALES INCOME AND EXPENDITURE ACCOUNT. Year ended 31st December, 1949. Cr.

£		£	s.	d.
63	To Stock at 31st December, 1948	85	0	0
137	,, Maps and Pictures purchased	710	1	10
101	,, Stationery and Packing	40	4	8
43	,, Postages, Sundry Expenses, etc.	43	10	0
83	,, *Balance* being Surplus for the year carried to Publication Reserve Fund	116	13	6
£427		£995	10	0

£		£	s.	d.
328	By Sales	420	12	7
85	,, Stock at 31st December, 1949	562	14	3
14	,, Building Society Interest	12	3	2
£427		£995	10	0

BALANCE SHEET.

THE GEOGRAPHICAL ASSOCIATION.

31st December, 1949.

1948 £		£ s. d.	£ s. d.
	ACCUMULATED FUND.		
	Balance at 31st December, 1948 ..	493 14 0	
	Add: Surplus as per Income and Expenditure Account for the		
494	year ended 31st Dec., 1949 ..	186 2 0	
			679 16 0
408	Sundry Creditors		364 15 7
307	Subscriptions for 1950 paid in advance		314 7 6
1,209	Per Contra		1,358 19 1
	PUBLICATION RESERVE FUND.		
	Balance at 31st December, 1948 ..	824 5 7	
	Add: Surplus from Miscellaneous Map Sales, Income and Expenditure Account for the year ended 31st Dec., 1949 ..	116 13 6	
824	Per Contra		940 19 1
	LIFE MEMBERSHIP SUBSCRIPTION FUND		
	Balance at 31st December, 1948 ..	2,122 5 3	
	Add: Receipts during the year ended 31st December, 1949		
	Subscriptions	66 0 0	
		2,188 5 3	
	Less: Amount written off 3% Savings Bonds 1965/75 to reduce to par value	6 2 0	
2,122	Per Contra		2,182 3 3
£4,155	Forward		£4,482 1 5

1948 £			£ s. d.	£ s. d.
	ACCUMULATED FUND			
86	Sundry Debtors		109 9 10	
20	Income Tax Recoverable		19 13 8	
	Investments at par:—			
200	£200 3% Savings Bonds 1965/75 (Market Value at 31st December, 1949, £190)		200 0 0	
	CASH AT BUILDING SOCIETY AND BANK			
739	Building Society ..	912 11 6		
164	Bank	117 4 1		
			1,029 15 7	
1,209	Per Contra			1,358 19 1
	PUBLICATION RESERVE FUND			
32	Duplicator		32 3 2	
85	Stock		562 14 3	
20	Sundry Debtors		43 2 9	
687	Cash at Building Society		302 18 11	
824	Per Contra			940 19 1
	LIFE MEMBERSHIP SUBSCRIPTIONS FUND			
	Investments at par:—			
170	£170 3% Defence Bonds	£170 0 0		
1,446	£1,646 4s. 2d. 3% Savings Bonds, 1965/75	1,646 4 2		
300	£300 3% Savings Bonds, 1955/65	300 0 0		
			2,116 4 2	
	(Market Value at 31st Dec., 1949, £2,032).			
206	Cash at Building Society		65 19 1	
2,122	Per Contra			2,182 3 3
£4,155	Forward			£4,482 1 5

THE GEOGRAPHICAL ASSOCIATION.

BALANCE SHEET—*continued.*

31st December, 1949.

1948 £		£	s.	d.	£	s.	d.
4,155	Forward				4,482	1	5
	Jubilee Fund						
	Balance at 31st December, 1948 ..	905	12	1			
	Add: Receipts during the year ended 31st December, 1949, Donations	1	14	0			
906	Per Contra				907	6	1
	Herbertson Memorial Fund						
	Balance at 31st December, 1948 ..	259	2	0			
259	Per Contra				259	2	0
£5,320					£5,648	9	6

1948 £		£	s.	d.	£	s.	d.
4,155	Forward				£4,482	1	5
	Jubilee Fund						
820	*Investment at par:*— £820 3% Savings Bonds, 1965/75 (Market Value at 31st Dec., 1949, £779)	820	0	0			
86	Cash at Building Society	87	6	1			
906	Per Contra				907	6	1
	Herbertson Memorial Fund						
250	*Investment at par:*— £250 3% Savings Bonds, 1965/75 (Market Value at 31st Dec., 1949, £237)	250	0	0			
9	Cash at Building Society	9	2	0			
259	Per Contra				259	2	0
£5,320					£5,648	9	6

8th March, 1950.

DAVID SMITH, GARNETT & CO.
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MANCHESTER.

REVIEWS OF BOOKS

MEMBERS of the Library should know that, with very rare exceptions, books reviewed in this journal may be borrowed from the Association's library. The review columns are, therefore, supplements to the catalogue.

Huddersfield Highways down the Ages. W. B. Crump. 13 × 21 c.m. xi + 150. Huddersfield : The Tolson Memorial Museum. 1949. 6/–.

All those who have learned to admire the works of W. B. Crump will have heard of his death with profound regret. Many of his friends will long remember the amazing determination which alone made it possible, in the face of growing physical disabilities, for this work to be completed.

"Huddersfield Highways down the Ages" is a fitting memorial to years of meticulous and imaginative research. It presents a panorama through the centuries of the means of travel, the routes used and the physical and economic setting which conditioned the developing pattern of the highways and of the traffic which passed along them. The information presented extends far beyond the bounds of Huddersfield itself. This book will be of inestimable value to those who would seek guidance on how to construct the past on the basis of varied evidence which has survived into the present. In a happy way it falls into place beside those other works, also written by W. B. Crump, which have done so much to illuminate the historico-geographical background of the West Riding we know to-day. K. G. T. C.

Gloucestershire, Somerset and Wiltshire : A Geographical Analysis. University of Bristol : Reconstruction Research Group. 20 × 32 c.m. 12 pages. Bristol : J. W. Arrowsmith, for the University of Bristol, 1949. 8/6.

This monograph is a development of the Land Classification memoir published by the University of Bristol, Reconstruction Research Group, in 1947. Although described as "a geographical analysis" the work is concerned entirely with land classification, and the main findings of the Research Group are presented in three maps, each on the scale of 1 : 253,440. These are designed to give a "general picture" of the region and are reduced from the "1 inch" maps on which the work was recorded. The larger scale maps are filed in Bristol University and reference to them is invited.

The first map reproduces the work of the earlier land classification. It gives a threefold division into good, medium and poor quality land, based largely on soil and site factors, and certain sub-divisions such as highly cultivated land used for market garden purposes and land of specially high grazing quality. To this is now added a topographical map showing land above 700 ft. O.D., land with a gradient of 1 in 7½ or steeper, and land liable to flood. The Research Group then undertook a third analysis of "features of special interest." These include areas of particular value to students of ecology, archæology, geology, ornithology and botany, but a separate map of these areas has not been published owing to heavy costs. The third map is a composite combining the results of the three analyses and distinguishing areas of first and second priority for reservation ; areas possible for industrial development and "where the loss to the public interest will cause the least damage" ; and areas where such development should be permitted only after special investigation.

Accompanying the maps is a brief text prepared by Mr. O. D. Kendall. It sets out the principles of classification and the method of compilation of the composite map and is illustrated by four photographs selected to show scenery typical of the West Country.

The monograph is designed as a guide to assist planners in the three counties and is not primarily for geographers. The maps, however, include much information of value to the geographer. Two facts stand out; the comparatively small area of first class land in this agricultural region, and the close relationship between steep slopes and major geological features. Some detail has inevitably been lost in the reduction of the maps to the ½-inch scale, but they are generally clear, though the composite map is a little confusing at first sight. Its clarity could be improved by breaking the black line work for the names.

The Research Group shows a keen appreciation of the many interests which must be considered in any question of land-use and of the increased amenity value of open spaces when in close proximity to large urban areas. A scenic classification, as Mr. Kendall points out, is a matter of personal opinion, but every effort has been made to reach general agreement. The classifications used are very similar to those employed by the West Midland Group in the adjacent region. The value of the work of both groups is thereby increased.

A. A. L. C.

The Limestones of Scotland. T. Robertson, J. G. C. Anderson, J. B. Simpson. 15·5 × 25 cms. viii + 221 pp. Edinburgh: H.M.S.O. 1949.

During the war a rapid survey was made and published of Scottish resources in limestone. The present volume brings this up to full scale in detail and accuracy. The greater part of the book is devoted to a catalogue by counties of the occurrences of limestones of economic value, the detail extending to descriptions of individual quarries and the composition of their limestones. The book is thus primarily of economic and indeed commercial interest, but the introductory chapters are important to geography, in its economic aspect at least. R. M.

Planning Outlook. J. S. Allen. 23·5 × 13·5 cms. vii + 82 pp. London: Oxford University Press. 1949. 10/6.

"Planning Outlook," edited by Professor Allen, is the new quarterly Journal of the School of Town and Country Planning at King's College, University of Durham. The four articles in this number, cover a wide range of topics and includes summaries in German and Spanish. "Design in Rural Landscape," by Mr. B. Hackett, indicates that the potential legislation covered by the Town and Country Planning Act of 1947 has still to be exploited imaginatively by the landscape architect. Similarly, Mr. R. W. Paterson, in his article "The Control of Urban Building Development," indicates similar possibilities of legislation in the planning of central built-up areas. Mr. C. F. Riley, in "Between the Lines," reflects on the methods of systematic notation surveys that the 1947 Planning Act has empowered on the local authorities.

The need of present planning policy, especially in country planning, seems to be not more legislation but more factual information. This latter Dr. Geddes has provided in his interesting article "The Agricultural Unit: the Farm Labour-Team." The social problem of the agricultural worker in Scotland, with his semi-nomadic migrations from farm to farm each year, are intimately related to the tied-cottage system of Scottish farmsteads. In this geographical study, illustrated with eight maps, Dr. Geddes has given the planners some introductory material necessary for the regrouping of rural houses and so building upon that hamlet community life which Scotland has had traditionally. The recommendation to re-group rural dwellings, first made in the Royal Commission on Housing in 1918, and reiterated by several reports since then, cannot yet be implemented until a detailed factual survey of social conditions in each region is made. Towards this regional analysis of the Scottish countryside Dr. Geddes has made a useful contribution. It is hoped that the future of this new planning journal will be associated with similar factual surveys necessary for planning and not only with academic principles and standards. J. M. H.

The Expansion of Europe into the Far East. J. T. Pratt. 13 × 19 cms. 218 pp. London: Sylvan Press. 1947. 10/6.

Sir John Pratt's book is based on a course of eight lectures delivered to history students of Cambridge University, as part of a new course on "The Expansion of Europe since the 14th Century." The author's experience of China extends over 50 years and he has spent his retirement lecturing and writing on

China. This book reads very easily and shows every evidence of careful planning and arrangement. Wisely, the author has considered in some detail the changes in Russia and in Japan which have taken place during the years of China's disintegration. Many readers will rejoice in the realistic approach to Confucian civilisation, on which Sir John quotes with peculiar aptness from the Book of Common Prayer, 1549, " There was never anything by the wit of man so well devised or so sure established which in the fulness of time has not been corrupted." Then follows a description of the civil service recruitment. At many points in the book, also, the difference between Chinese theory and practice is explained : so often, a Chinese government has been content to build a new Jerusalem on paper in the shape of admirable laws that could not be carried out. All this is the essential background for a study of the present position, which Sir John treats in considerable detail. The account of the struggle between the Yenan and Chungking authorities is particularly interesting " . . . articles appeared in the Press describing Yenan as democratic China and Chungking as feudal China, and suggesting that Yenan might be more worthy of American support than Chungking " . . . . " in fact, the Kuomintang is as much the child of Soviet Russia as the Chinese Communist Party " (p. 195). The reviewer hopes that this admirable short book will be widely read : it should be particularly useful to students, for whom it was first composed, to teachers, and for certain types of sixth-form work in schools. T. W. F.

Map of the Oasis District of Pirzada in Afghanistan. Johannes Humlum. 22 × 31 cm. Aarhus : Geografisk Institut Universitetet. 1949.

Irrigation and oasis-farming in parts of southern Afghanistan depend on water from subterranean channels (*karezes*) constructed as connections between a series of wells. The deepest wells lie nearest the mountains and reach down to the water table so that the water from here runs through the channel from well to well until it eventually reaches the surface in a ditch which conducts water to the oasis fields. Part of the work of the third Danish expedition to Central Asia was to gather information on the technique, sociology and economy of *karez* irrigation and this map is an interim report. It is a large scale plan (1 : 2,100) of the topography of the district, the *karezes*, their widespread channel systems and associated fields. The map is clearly drawn and well produced in four colours but when unfolded is about 33½ in. by 47½ in. ; a smaller scale than that actually employed would still have shown the detail clearly and would have avoided the inconvenience of such a large map sheet. N. P.

The Arab of the Desert. H. R. P. Dickson. 23 × 16 cm. 648 pp. London : G. Allen and Unwin. 1949. 63/–.

Literature on Arabia is, for the most part, of a highly specialised kind, for of all territories of the world this region seems to breed its own devotees. Here is another book in the full tradition of Doughty, Lawrence, Philby, Thomas, and Musil—one that arises from a lifetime of intimate acquaintance with Arab ways. Col. Dickson was brought up in Syria, and spoke Arabic from an early age ; his career has been spent largely in Iraq and Kuwait, partly as a Political Officer. His book is a store of detailed information on tribal life—in certain aspects probably the most voluminous study available in English ; and he covers a vast range of topics, from tribal organisation and territorial distribution to material culture, morals, and even anecdotes of the camp fire. As befits his subject, Col. Dickson omits little of the harsher and cruder sides of Arab life, and one might say that his account has at times a Zola-esque directness.

Though in general the book is a rich collection of highly valuable data, there are in addition certain less satisfactory features. One profound omission is any attempt at a general geographical description, though environmental aspects sometimes appear incidentally ; and there is a lack of co-ordination and plan, so that we are apt to pass suddenly from the serious to the trivial. Nevertheless, with its remarkable detail, its compendium of maps and genæologies on separate sheets, and its careful pen-and-ink drawings, Col. Dickson's book is a notable addition to Arabian studies. W. B. F.

The Splendour that was Egypt. M. A. Murray. 16·5 × 24·3 cm. xxiii + 354 pp. London : Sigdwick and Jackson, Ltd. 1949. 30/-.

This volume follows in the same series as J. O. Stobart's *The Glory that was Greece* and *The Grandeur that was Rome*. It is dedicated to that great Egyptologist, Flinders Petrie, who, in the words of the author, " out of the hobby of antiquarianism created the science of archæology." Dr. Murray's admiration for this great man, who even in the mind of the layman is indelibly associated with the study of archæology, is reflected in the fact that the seventh and last chapter of her book is a brief one devoted to his life and work.

Of the remaining six chapters the first short one on Prehistory is followed by scholarly yet very readable accounts of History, Social Conditions, Religion, Art and Science, and Language and Literature. Something of interest to the geographer is to be found in each of these chapters, but his attention will be focused especially on the account of Social Conditions. Here will be found answers to many of the questions the layman has wished for many years to ask the Egyptologist. One can but mention a few of the topics which catch one's attention ; the pattern of agricultural practice almost unchanging through the centuries, the seaborne timber trade of the third dynasty, the education of the administrative classes, or how the workmen lived who built the great monuments —some of the earliest examples of town planning. Elsewhere one will find interest in such miscellaneous topics as the strange results of the matriarchical system of inheritance, systems of time-keeping, and a thing which always intrigues the male reader—how did our ancestors shave ? The book is illustrated by 93 plates on art paper.

F.H.W.G.

South America Called Them. V. W. Von Hagen. 22 × 14 cms. xiv + 401 pp. London : Robert Hale, Ltd. 1949. 21/-.

In an easy narrative style, the author describes the exploration and scientific achievements of four great men : La Condamine, Humboldt, Darwin, and Spruce. But the book is not simply another biographical study. In an original treatment, it displays through these four explorers, four time-periods, four geographical regions and four distinct sciences. These youthful scientists made a more lasting impression on the world by their quiet penetration of this unknown continent than had been achieved by the more spectacular entry of the *conquistadores*. Each of these four men demonstrated ever more clearly, the unity of the earth sciences and the sphericity of the globe. Thus their discoveries in far-distant South America quickly caused reaction among the *savants* and even politicians of Europe. The book is of absorbing interest since the writer himself followed the trail of these great explorers. His account of the Andean ranges and the Amazonian forests is first-hand, based on his own keen observations vividly described. There is, however, one apparent discrepancy in the travels of Humboldt in Spain, on page 121. The high quality of the writing is further enhanced by the excellent illustrations. There are six maps and charts and some 24 photographs. In addition, there is a good selective bibliography at the end of the book. Mr. Von Hagen's work can be recommended both for enjoyable reading and serious study.

J.M.H.

Physical Geography. Philip Lake. 14 × 23 cm. xxviii + 410 pp. Cambridge : The University Press. 1949. 15/-

There must be very few British geographers who have not at some time in their career studied Philip Lake's *Physical Geography*. It became a classic right from its first appearance in 1915 and has been steadily reprinted ever since despite the appearance of more up-to-date competitors. But the advances of the last decade were clearly beginning to render the original edition incorrect in many places. Unfortunately Philip Lake himself was unable to make the revision but three of his early pupils of the Cambridge School, Professor J. A. Steers, Professor Gordon Manley, and Mr. W. V. Lewis, have attempted the difficult task of revision whilst trying to retain the character of the first edition.

It has been possible to leave some sections virtually untouched but others have had to be completely rewritten. Most change has probably been necessary in the section on Oceanography where only the chapter on deep sea deposits remains largely the same. Even this chapter may before long need revision. It is pleasant to see that the stationary wave theory for tides has been incorporated and is now readily available for the student—Marmer's classic work has long been out of print and difficult of access. There have been substantial changes in Part III dealing with the Land: shorelines, river grading, rejuvenation, river erosion, glaciation, and the structure of the earth have all been brought more into line with recent views. Least change of all has been made in the part dealing with the Atmosphere, more recent advances here being covered by an additional chapter.

There is little one can criticise in this new presentation. The meteorological statistics might, one felt, have been brought more up-to-date—most relate to periods before 1910. V-shaped depressions are now usually referred to as troughs. The addition of much recent work may also make the book somewhat indigestible in places for the beginner—who will undoubtedly be a little bewildered when confronted with air mass, instability diagrams, lapse rates, T/S diagrams, water mass, etc., into which he could perhaps have been led a little more gently. The description of the deep water circulation of the oceans would also seem to call for supplementary diagrams. The inclusion of the whole of Lake's original preface listing photographic illustrations now removed from the book is a little misleading and now seems out of place.

These are small points, however, and it is with real pleasure that one welcomes the appearance of this second revised edition, for once again it will be possible to recommend Lake's *Physical Geography* to students with the assurance that it is in no way misleading or out of date. Great credit is also due to the Cambridge University Press for producing the book for the low price of 15/–, despite the text having risen to over 400 pages with in addition 46 excellent photographs and over 200 diagrams and maps. W.G.V.B.

Climatic and Weather Exercises. W. G. V. Balchin and A. W. Richards. 19·5 × 25 cm. 79 pp. London: George G. Harrap and Co., Ltd. 1949. 6/-.

Deprived of the daily weather bulletin during the war the British public has shown increased interest in weather science in recent years: at the same time, a multitude of men and women have returned to civilian life from the Forces possessed of some knowledge of weather mysteries and of a desire to know more. The new enthusiasm has called forth a number of useful books on the subject of climate and weather and to these the book under review may be added. Its aim is to implant at the school level the first principles of climate and weather study. The arrangement of the material is formal and logical. In the first three chapters the climatic elements, temperature, humidity, rainfall, and atmospheric pressure, are dealt with. There are useful exercises including some which involve drawing isotherms, isobars and isohyets from statistics. A chapter on rainfall regimes, planetary winds and pressure systems follows. Then the methods of collecting and transmitting weather data and of constructing weather charts are described. Here the reader is introduced to the essential symbols used for this purpose. Exercises involving the interpretation of simplified weather charts follow. The last two chapters are devoted to the climate of the British Isles, and to suggestions for practical work in schools. There is a short bibliography and a glossary of technical terms.

One or two small matters might be reconsidered for a subsequent edition. On page 26 the first statement under the heading Humidity should be clarified, and on page 37 the sentence beginning: " In the zone of contact . . . " is not at all clear to the reviewer. In Fig. 21 the slope of the warm frontal surface is shown exceeding that of the cold front, and on page 36 a more detailed and explicit account of air movement in relation to isobars might perhaps have been given. In the selection of data used for delineating fronts on maps one wonders why temperature should have been selected in preference to dew point.

The book is intended mainly for courses leading up to School Certificate but the authors hope that it may be useful to Sixth Form pupils and to those in their last year at the Secondary Modern School. The format of the book is attractive, it is well bound and printed on good paper. There are no photographs but many maps and diagrams. E.P.B.

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